BULLETIN of the
SCHOOL OF EDUCATION
INDIANA UNIVERSITY

Indiana and Midwest School Building Planning Conference: Proceedings

Vol. XXIX, No. 6 November, 1953

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BULLETIN OF THE SCHOOL OF EDUCATION
INDIANA UNIVERSITY

Indiana and Midwest School Building Planning Conference: Proceedings

Planning Educationally Sound Buildings at Low Cost

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FOREWORD

Again we are happy to submit the *Proceedings* of the 1953 Indiana and Midwest School Building Planning Conference. This year we had the largest attendance of any year, with attendance coming especially from the groups of architects, board members, and trustees. Without doubt our speakers have been from among the top people in the country in their professions. Unfortunately, some of the talks were accompanied with slides which can not be reproduced in this bulletin. Even though the reader has missed the excellent presentations of the speakers, we hope that you will receive considerable inspiration from the printed word. We can not put down on paper the enthusiasm, magnetism, and personality of the presentations; however, we do believe that the high caliber of the meetings will certainly whet the appetite of the reader to be present at the next building conference to be held about this time next year.

Without doubt the service rendered by the school of Education of Indiana University has contributed very materially to improving school plant planning throughout the Middle West.

Kindly accept this as your proxy to that Conference if you were unable to attend, and, if you were there, as a means of refreshing your memory of the many splendid things that were brought out at that meeting.

PAUL W. SEAGERS,
Chairman.

Program

1953

INDIANA AND MIDWEST SCHOOL BUILDING PLANNING CONFERENCE

THEME: *"Planning Educationally Sound Buildings at Low Cost"*

Designed to interest teachers, principals, superintendents, board members, trustees, architects, engineers, parents, and citizens' advisory groups.

PAUL W. SEAGERS, *Conference Chairman*

WENDELL W. WRIGHT, *Dean, School of Education*

SCHOOL OF EDUCATION INDIANA UNIVERSITY
BLOOMINGTON, INDIANA

THURSDAY AND FRIDAY
JULY 9-10, 1953

PROGRAM

THURSDAY MORNING, JULY 9

School of Education—University School

9:00 a.m.*
Registration—Lobby, University School

10:00 a.m.
Auditorium—University School
Chairman, H. L. Smith

Welcome: H. B. Allman

SCHOOL BUILDING PROGRESS I HAVE SEEN
H. L. Smith

WHERE TO NOW?
Wendell W. Wright

THE STATE PLANS
Wilbur Young

THURSDAY AFTERNOON, JULY 9

1:30 p.m.

Auditorium—University School
Chairman, William E. Wilson

PLANNING THE SCHOOL SITE
A. Carl Stelling

DEVELOPING EDUCATIONAL SPECIFICATIONS
Paul W. Seagers

Discussion: Robert W. Harris
Mrs. John E. Fell
Harold Maurer

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* Daylight Saving Time

THURSDAY EVENING, JULY 9

8:30 p.m.
Auditorium—University School
Chairman, A. T. Lindley

FORM IN EDUCATIONAL ARCHITECTURE
William W. Caudill

FRIDAY MORNING, JULY 10

9:00 a.m.
Auditorium—University School
Chairman, Carlyle A. Mutschler

NEEDED RESEARCH
Darrell B. Harmon

WARM AIR HEATING
Lorin G. Miller

Discussion: George Caleb Wright
Robert Bulleit
Lloyd Fitzpatrick
Hans Mohn

FRIDAY AFTERNOON, JULY 10

1:30 p.m.
Auditorium—University School
Chairman, H. F. Schulte

THE HIGH SCHOOL OF THE FUTURE
G. Robert Koopman

Discussion: Edward D. James
Carl G. F. Franzén
Christian W. Jung
Grier M. Shotwell

WHO'S WHO AMONG THE SPEAKERS

Allman, Heyman B., Director, Summer Sessions, Indiana University

Bulleit, Robert, Superintendent of Schools, Salem, Indiana

Caudill, William W., Professor of Architecture, Texas A and M

Cunningham, Clyde, Superintendent of Schools, Peru, Indiana

Erne, Judson S., Principal of the High School, Columbus, Indiana

Fell, Mrs. John E., Board of Education, Kokomo, Indiana

Fitzpatrick, Lloyd, Board of Education, Washington, Indiana

Franzén, Carl G. F., Professor of Education, Indiana University

Harmon, Darrell B., Consulting Educationist, Austin, Texas

Harris, Robert W., Board of Education, New Albany, Indiana

James, Edward D., Architect, Indianapolis, Indiana

Jung, Christian W., Assistant Professor of Education, Indiana University

Koopman, G. Robert, Associate Superintendent, State Department of Public Instruction, Lansing, Michigan

Lindley, A. T., Superintendent of Schools, Fort Wayne, Indiana

Maurer, Harold, Architect, South Bend, Indiana

Miller, Lorin G., Dean of the School of Engineering, Michigan State University, Lansing, Michigan

Mohn, Hans, Trustee, Clay Township, St. Joseph County

Mutschler, Carlyle A., President of the Board of Education, Nappanee, Indiana

Schulte, H. F., Superintendent of Schools, Jeffersonville, Indiana

Seagers, Paul W., School Building Planning Consultant, School of Education, Indiana University

Shotwell, Grier M., President of the Indianapolis Board of School Commissioners

Smith, Henry Lester, Dean Emeritus, School of Education, Indiana University, and Director, School Building Planning, Indiana State Department of Public Instruction

Stelling, A. Carl, Landscape Architect, New York City

Wilson, William E., County Superintendent of Schools, Clark County, Jeffersonville, Indiana

Wright, George Caleb, Architect, Indianapolis, Indiana

Wright, Wendell W., Dean, School of Education, and Vice President, Indiana University

Young, Wilbur, State Superintendent of Public Instruction, Indianapolis

SCHOOL BUILDING PROGRESS I HAVE SEEN

by

H. L. Smith

My experience as a student, teacher, and school administrator in school buildings for grade and high school pupils covers a span of 72 years in time. In types of building, the range is from single rural school buildings through village school buildings, city school buildings, and a university school building plus personal observation of school buildings in most of the states in the United States and in 32 different foreign countries. To untangle the mesh of observations made and to arrange these observations in any system either of chronological or of functional progress imposes an impossible task. The topic assigned me has been such a challenge, however, that I have made a serious effort to extract a significant picture of the changes that have occurred and of the factors determining the sequence of these changes.

In two of the five rural schools that I attended, the school plants were most primitive—a one-room frame building with a wood stove in the middle of the room and rows of double seats on either side reaching to the long recitation bench facing the platform on which the teacher's desk was located. Hooks for pupils' wraps were on the rear wall, and on the floor immediately below these hooks was space reserved for lunch baskets. Later, it became the practice to add on one side of the entrance to the building a small room for wraps and lunch baskets. There was even then no space for storage. Brooms rested in a corner, and wood was piled sometimes in the rear of the room and sometimes near the stove. These one-room buildings were lighted from two sides. On the floor toward the front of the room was a water bucket used for drinking-water and a common gourd dipper from which the pupils drank. The water was carried in one instance from a spring a hundred yards away at the base of a hill in the adjoining woods, and in the other instance from a residence spring a half mile away. Two pupils were usually released during school time to get and bring back the pail of water,

and they would trudge along the pathway through lanes, pastures, or woods. Sanitary provisions were at a low ebb, indeed.

The school site in each of these cases was no larger than was necessary for a reasonable approach to the building and a passageway around it. Toilet facilities were in one case the woods surrounding the school site and in the other case a narrow open space along the length of the rear of the building. In this latter case there was no privacy except through the device of excusing pupils one at a time during school session.

The recreational provisions were most limited. In one case it was a game of "hound and rabbit" in which the rabbits were given a leeway of distance before the hounds were released. The rabbits ranging through fields and woods dropped torn pieces of paper as substitute for scent that made their trailing possible. Or it was marbles, played outside in good weather and inside during inclement weather. In the other case the pupils brought saws and axes and cleared off a patch in the adjoining woods large enough for a baseball game called "three-cornered cat." With the logs, a jail was built and prisoners were permitted to dig with their hands a way out under the lowest log if they could withstand the punishment they would receive. This punishment was administered by the outside police and consisted of switchings with slender broken-off twigs on their extended hands, head, and body as they were trying to make the prison break. Since those days, out-of-doors educational areas and site planning needs have expanded to include such areas as landscape areas, paved play areas, open grassed areas, outdoor classrooms, growing areas, equipment space, nature study provisions, park and neighborhood recreation areas, and parking areas.

In my experience as a pupil in the rural schools, the only progress made in the rural school was in the modest enlargement of the school site and the provision of outside toilets. When I entered the eighth grade in the city schools I encountered a new design, a three-story brick building with a basement with inside dry toilets. Later, outside stair fire escapes were added to this building, these fire escapes being reached from the windows of the individual rooms. An advance over this arrangement was the same type of stairway

escapes reached from corridors or passageways. Later still, sliding chutes were substituted for supposed additional safety of egress. These types of safety provision were stimulated by the tragic Ohio school building fire in which great loss of life resulted. Slower progress had been made previously, however, on the basis of a growing feeling of responsibility on the part of society for safety measures for all and especially for school pupils, since they were bound by school attendance compulsion to occupy these spaces.

One of the first steps taken by the Indiana Legislature to assume some responsibility for exercising its constitutional right to legislate governing standards for public school plants was the creation in 1881 of the State Board of Health. This Board was authorized to give advice regarding location, drainage, water supply, sanitation, and heating and ventilating of any public building. In 1896 the Board adopted rules condemning buckets or pails. In 1906 it gave its first approval of a school plant. In 1911 the Sanitary School Law was passed covering site, location, lighting, seating, etc. In this same year the first joint bulletin on school buildings was published by the State Board of Health and the State Board of Education.

The State Board of Tax Commissioners was created in 1891, and in 1919 it was given authority for assessing, fixing tax rates, and passing on bond issues. The State Board of Accounts was created in 1909. The law creating it was amended in 1945, prescribing the system of accounting.

Supplementing my observations of the progress observed in our state regulations governing school plants, I should like to refer to my experience in the Canal Zone where I observed the cooperation of school officials, engineers, and architects, and the Sanitary Division in determining the adequacy of the school site, building construction, and equipment.

It was in Minneapolis, when I was Assistant Superintendent of Schools there, that I first encountered the successful effort of the school and civil officials to cooperate in enlarging the school site for recreational purposes. The policy of locating new school buildings in the vicinity of city parks, so that the park facilities might be available for school use, was introduced there as early as 1915.

In the early days of the development of schools in Indiana, school buildings were built to accommodate the school popula-

tion of the particular time. No provision was made in the design for future expansion of the building or for rearrangement of the space within the building to provide for unexpected expansion of departments. The first of these provisions calls for a design in which the corridors may be continued, with the addition of future rooms bordering the corridors as in the original plant. The second provision calls for room partitions that are not supporting walls and can therefore be rearranged for enlargement or continuation of a particular room space.

In the case of schoolroom lighting, progress has been made from multilateral to unilateral natural lighting. To avoid cross lighting and dimness of light where there is unilateral lighting, modification of design has varied through directional block lighting, clerestory lighting, varying orientation of rooms for lighting, sloping ceilings to redirect and reflect light to the windowless side, and, finally, artificial lighting that makes possible any shape and location of room as far as light is concerned. Today factors of intensity of illumination, brightness contrasts, and reflection properties are still further modifying interior room design.

Ventilation provision has varied from window ventilation, to forced ventilation from a central plant, to unit ventilation. Forced ventilation from a central plant demanded a marked change in the design of the building, as did the change to a central heating plant from stoves in individual rooms.

A great change in the school plant has come about in the provision of storage space—storage space for wraps, for teaching materials, for pupils' working materials, for janitor's materials, for schoolroom equipment, for playground equipment, for yard machinery, and for school busses.

Water supply provisions have changed from springs, cisterns, shallow wells, deep driven wells, ponds, and lakes to regular water systems.

Heating provisions have varied from the wood stove, coal stove, and central heating plant to individually heated small groups of rooms with modern oil or gas heating provisions. Each of these steps has involved building design modification.

Building materials have ranged from frame to brick and stone and, for economy's sake recently, to steel and block con-

struction. In the latter instance beauty and harmony and general appearance have been somewhat sacrificed, but function has been retained.

There are many factors that affect the design of the school plant. As the theory at the base of these factors has changed there have been consequent changes demanded in the design of the plant. Among these factors in education that have undergone change as the result of new insights are the philosophy of education, the school site and plant, the pupil, the teacher, the curriculum, the methods of teaching, the organization of the school, the plan of administration, the support of education, the making and keeping of records, the measurement of educational product, and transportation.

Costs of labor sometimes effect changes. Only recently the cost of plastering has risen to the point where plastering is being avoided to such an extent that plasterers are being thrown out of employment. The officers of the plasterers' organization are concerned with the situation and are now seeking ways of redirecting this trend.

Our general philosophy of education is modified from time to time. One of the fundamental changes in philosophy broadened the area of pupils to be brought under the influence of the educational program. We now believe that society, for its own sake and in justice to the individual members, should give each one a chance to profit from an education that fits his needs, desires, capacities, and financial status. This broadened area of pupils calls for new types of offerings, and these demand variations in the school plant to facilitate the changed teaching needs. Originally only a minimum of the essentials in elementary education was required or offered for all. Now even adults are offered opportunity to further their elementary and vocational education. Moreover, it takes more space for an adult than for a child, with the same educational offering. So this additional space requirement affects the size and even the design of the building.

It is easy to see how the introduction of new subjects like typing, woodwork, music, etc., calls for added and modified building space. Added space for permanent cumulative records again demands additional and specialized space, as does also the provision for testing the results of the educational process.

The comfort and welfare of the teacher call for storage space for wraps, rest rooms, professional reading library space, special testing facilities, collections of photograph and magazine pictures, pamphlets, a teachers' lunchroom, toilet facilities for teachers, drinking water conveniences, parking space for cars, recreational facilities, a communicating system, provision for personal mail, and library facilities for professional improvement.

The method of instruction has had an effect on the space allotment and arrangement of the classroom. I recall that at one time in my experience physics and chemistry were given in a six-week course from textbook material. Later the laboratory method of instruction was substituted in these fields, and larger rooms with specialized equipment and supplies had to be substituted for the regular academic classroom space. The modern regular classroom is called upon to provide a general work area; a library or quiet individual study area; places for emphasis on art, music, and dramatics; and handworking areas for wood, cloth, metal, and crafts. All of these spaces are over and above the early traditional classroom provisions.

More space and additional equipment demanding storage space is required in carrying out the psychological theory, established through experiment, that pupils learn more rapidly and retain what they learn for a longer period when some physical participation on their part is a vital part of their learning. Such child-development classrooms emphasize interest as a motive for learning, wide individual differences existing among children, need for a wide range of methods and materials, and the fact that abstract ideas have a close relationship with actual concrete expressions of the child.

The further fact that pupils learn better in a state of emotional well-being and in a healthful environment demands building changes not formerly deemed advantageous.

Design of a schoolroom yields not so much to goals as to activities engaged in, in reaching those goals.

The extension of the school program downward into kindergarten or nursery schools or upward into adult education calls for additional space, and in the latter case for relatively larger space and for more specialized space and equipment. Hence it affects the building plant.

The teaching of elementary science partially through observation of plants, insects, and animals calls for additional yard space where these materials exist in their natural state.

The change in physical education from the Swedish gymnastic type to free play opportunities has necessitated major readjustments of space provisions.

The introduction of aquaria and animal pens and museums as supplementary teaching materials has called for additional building structures as well as for additional space. The activity program substituting for the mere receptive process in learning has demanded an increase in per pupil space in the elementary classroom from 15 or 18 square feet per pupil to 25 or more square feet per pupil.

The integrated versus the subject-matter organization of the curriculum has meant the substitution of one large room and one teacher for the differentiated room and special subject teachers. The type of organization and administration affects school plant provision. With consolidation and with departmentalized arrangement or the platoon system come special rooms and provisions for specialized teachers.

The concept that the school building should to some extent contribute to the general community use has led to different placement of cafeterias and assembly halls and to different channels of access to the same.

Provision for handicapped children, such as the hard-of-hearing, those having defects of vision, and the physical cripples, has been met by special building designs and other plant and equipment modifications calling for ramps and pools for the crippled.

Community recreational use of the school plant has resulted in provision for such activities as skiing, sliding, skating, and swimming. Provision for community dinners has resulted in independent entrances to the building and to the cafeteria and dining room, or to the provision of passage closing gates near the corridor entrance which permit the closing off of the passage into the main part of the school building.

Other community uses have added to the desirability of a school auditorium for various adult activities. Likewise, the development of new pupil organizations has created a demand for additional building space to accommodate their

activities. Indoor play space, for grade pupils especially, has drawn an additional space in the school building.

Increased space demands have also accompanied the addition of auxiliary rooms, such as administrative spaces, vaults, supply rooms, storage space, workrooms for teachers, rest rooms, medical and dental suites, and conference rooms.

This sketchy and spotty listing of school building progress I have seen does not pretend to present a logical or even a chronological picture of the observed changes. Its purpose will be served if it succeeds in emphasizing the major changes that have occurred, in presenting the factors in the educational process that affect modification of school plant design, and, finally, in impressing upon school people, the community, and the architects the responsibility for designing plants with the utmost flexibility of interior arrangement to meet needed changes and expansion possibilities as far as additions to the original plant are concerned.

WHERE TO NOW?

by

Wendell W. Wright

I want to discuss for a little while the question "Where Are We Going Now?" I am going to confine the subject to the state of Indiana. I am not a specialist in knowledge about school buildings. I enjoy them and appreciate them; but I don't know anything about them in a technical sense.

Of all our educational problems, I think our school building problem is one of the most outstanding. I have had the opportunity during the past year or two to work with a group of very excellent men, the Indiana Commission, studying school building needs. I want to repeat what I have said many times publicly: No man working with any commission has ever had a better group of men with whom to work. It was a joy all the way through. They were men of wisdom when it came to thinking through matters that needed thinking through. I would have no hesitancy, egotistical as I know this will sound, in saying that the Commission made a good report. I think it reflected the situation in the state and that it was made in the right direction—that its recommendations were good. I was aware from the start that not all the recommendations would be adopted by this legislature.

If you go back and look into the whole problem of the state's financial participation in the support of local school operation, you will find that it was advocated about 35 years before it really got into the basic support idea we have now. It first came up in the 1903 legislature, but the first legislative action about it was in 1905. This problem of the state's responsibility in helping local school corporations was brought up before the legislature in almost every session. Legislatures of 1909 and 1911 added to the concept that the state should share in the support of local schools. They gave it another push in 1923. Actually, the fundamental support law we have now did not get into operation until about 35 years or 40 years after the beginning of the agitation. Therefore, I am not discouraged.

I think that the last Commission's report was correct in its attitude, that the state should participate financially in local school building under certain conditions. I predict that in a period of less than 35 years the state of Indiana will adopt the fundamental principle embodied in that Commission's report. I was greatly surprised that the House and the Senate committees were so greatly interested in it at the last session. I had the opportunity to meet with them and found them exceedingly interested people to talk with about the report. Some of those who were the finest of the men in the legislature said, "We don't know whether we can ever get to the point of thinking that one part of the state should help to build school buildings for some other part of the state." You see, there is a long tradition of local support back of this thing. It is going to take a long time to change the direction of thinking. This was the same point of view expressed by those legislators in the early 1900's toward the operation of local schools. So no one need be discouraged. It is a long pull in my opinion. However, we have to recognize that education of all the children of the state is a state responsibility. That applies to buildings as well as to operation.

Now then, what are some of the things that we can look at immediately? I don't know as much about it as you know, but let's think together. Perhaps you noticed in this morning's paper that some $227,000,000 had been appropriated by Congress in federal funds for school buildings. We have had a number of people in this state receiving help from that source.

If you have a national figure of this kind and take 2½ per cent of it, you will know approximately what Indiana's share is. If that money were distributed in terms of anything related to population, it would mean that in the next few years the state of Indiana might have four or five million dollars from the federal government for school building.

If any of you have any hesitancy about accepting federal aid, forget it, because you would accept aid just as quickly as anybody else. You may oppose it publicly if you want to, and that is all right. Nevertheless, if you have school buildings to build and need the money, and if you cannot get the money locally but can get it from a federal grant, you will accept it regardless of what you say about it publicly. That

much money coming into Indiana would certainly be a great deal of help. A large number of children will be in school full days and not half days due to the fact that federal money has been available in the state for school buildings. That is a hopeful sign.

Another hopeful sign, I think, is the fact that the number of additional school corporations putting on a building tax is going up rapidly. Between 1951 and 1952, the number rose very sharply and it has gone up sharply again this year. The thing that most school corporations ought to have done four, five, or six years ago actually is now getting underway. That means that some additional money will be made available even though it is too late and too little to relieve every situation. There is a long pull ahead.

We will have to have children on half-day sessions, but I hope none of you ever try to justify it. I find local communities are ashamed of half-day sessions and they sometimes try to justify them by saying the children are getting along all right. Well, if that is true, then why have any schools at all? Let us face the facts. We are short in school buildings, and, sad to say, the situation will grow worse in the next few years.

But there are some positive factors. With an increased building tax, with the help of additional funds (perhaps federal funds or continuation of federal funds), and with consolidation and larger administrative units, we are showing progress. It is interesting that we have had these consolidation possibilities for a rather long period of time. I think there is real evidence that we have had a very sharp upturn in the consolidation of units in the last two or three years. Major consolidations, consolidations of some significance, were made last year at the rate of a little over one a month. You might well say that we are not going very fast when we get only 13 consolidations and need seven or eight hundred, but that is a good deal faster than we have been going. I think there is a definite tendency in that direction. The need for buildings has spurred on consolidation.

Another important thing in determining where we are going in the matter of school building is that we need to keep ourselves well informed. The facts must be kept before the public on both a state and a local level. I am hopeful that

some of the things that Mr. Young and I have talked about will be carried on. It so happens that I have to give up intensive work in relation to this study, but we are working out some plans with Superintendent Young to carry on some kind of continuous gathering of information, so that at the time of the next legislature there will be a reasonably up-to-date picture of the state. It is tremendously important to have the people of the state know what is going on concerning school building. We must always keep these problems before the general public.

As a result of the publication of the state school survey we had groups from about 110 communities come here to us for information, as they were sincerely interested in problems of their own. Often we could not do anything for them. However, we helped them a little by showing them how to study their own problems. In addition to the general surveys which the Division of Research and Field Services makes, approximately 8 or 10 a year, 100 communities have come in and asked to talk to us about their schools. Some were Parent-Teacher Association groups, some were township trustees, some were just interested citizens who represented communities or groups of communities. Why did they come to talk with us about their situation? They came, first, because they had become aware that there were these problems, and second, because they had become aware that these problems were involved in their own situation. This interest in school building problems has been due to the fact that the subject was in the air—it was being discussed, it was being reported on, it was in the papers. I will propose to Superintendent Young that one of the things we should do is to keep the people of the state intelligently informed about this critical situation and to keep our facts up-to-date. An informed citizenry is the essential basis of action in our country. There is no short-cut solution. We all have to help think through this problem.

The state must face its problems. It is only in that way that we can solve the problem of school building needs in the state. As far as I have anything to do with it, I am going to insist that one of our major purposes in the next year or two be to keep up-to-date on what is going on, what is being done, what situations are being met, and what the

conditions are in the schools of the state. This information should then be published. I know that it may be embarrassing for some of you and that you hate to say that you have 1,800 children on half-day sessions, but it is the only way we can wake up the people of the state and make them realize that it is the state's business to provide education for the children of the state. I have no criticism at all of anyone who has difficulty in arriving at that decision. Nevertheless, I think in the long run it is the only solution.

I would like to mention two other things concerning "where to now," both of which Dean Smith taught me. I have come to believe most strongly that the way to meet most problems is first of all to continue to study them. The university ought to be not only a place where we could carry on active study of what things are going on but also one where we could dig deeper and see what is back of these things. As a matter of fact, Dr. Seagers is here because Dean Smith, when he was here, felt the need for someone in his field and advised me so. One of the first things I did when I became Dean of the School of Education was to try to find a man in the field of school buildings. It is one of the most important phases of the work done by the School of Education. I am looking forward to doing some deeper research in school building than the research that merely involves keeping up-to-date factual material. We are considering, in fact we have on paper, the idea of developing an institute of school planning, and of inviting others to help us go into some of the newer developments in school building itself.

The second thing Dean Smith taught me is that we cannot quit working for the things we believe are right. We face many problems day in and day out, but on this statewide problem we can not give up. We must keep on hammering away. I think no greater proof can be made of the fact that we have been hammering away than the stories which have been told this morning. You would think we planned it this way. Here is Mr. Young telling about the progress over a period of time in schoolhouse planning as part of the State Department of Public Instruction. Dean Smith comes along and tells us the story of the development of school buildings. It is really a tremendous story. Why? Because somebody simply kept hammering and hammering and working and

working along these lines. We are so much better off than we were, all because people like Dean Smith and many others have continued to fight for good school buildings for the children of our state. If we have the knowledge of where we are going, and if we keep that before us, I will not be discouraged. I refuse to be discouraged when I see the progress that has been made.

THE STATE PLANS

by

Wilbur Young

The school building problem is the most serious problem in this state. As a state officer it is very close to me, and I hope in the next few minutes to discuss it from the point of view of the State Department of Public Instruction.

A few years ago, when I was county superintendent of Ripley County, the school inspector came to my office early in September to get acquainted with me and my schools. We traveled to the northern part of the county and visited some one-room schools which I had never been in before in my life. One particular school was located on the crest of a hill with trees growing within six or eight feet of the school building. No one had thought of sawing them down, although they took up needed playground space. When we walked in, we noticed the interior decorating. It was a bright royal blue. Everything was painted royal blue except the floor and the blackboards. The teacher was a good one. The inspector asked the teacher why he supposed the people had selected this particular site for a schoolhouse. The teacher, who had had many years teaching experience and was a very practical individual, said, "Well, I guess this was the only piece of ground in this end of the township that couldn't be used for anything else." Then the inspector said to him, "I wonder why the trustee selected this color of paint." Again the teacher replied, "It is very evident. The hardware man couldn't sell the paint to anyone else. Therefore, he sold it to the township trustee, who put it on the building."

The type of school buildings and environment of the latter part of the nineteenth century and the beginning of the twentieth century had a direct effect upon our educational program in the state of Indiana. I am not at all surprised that we ranked twenty-eighth or thirty-second or thirty-sixth in the field of education in the nation. We just were not doing things the way we should.

The plan that put us about twenty-eighth in the United States began to be evolved back in 1923 and 1924. The legislature set aside $60,000 to be used to study school buildings and supervision. Sixty thousand dollars then was about equivalent to $200,000 at the present time. If you were to go to the legislature now and try to get $200,000 for an educational project, you would see how difficult it is. So I want to compliment that legislature on doing a good thing. Ben Burris was State Superintendent of Public Instruction. The $60,000 was accepted and the studies proposed.

Dr. H. L. Smith was called in by Ben Burris to head these two studies. You probably know the story as well as I do—the Dean was too busy to accept. Ben Burris called him back. When Dr. Smith walked into the State Superintendent's office this time, there was the President of Indiana University. Ben Burris and the President of Indiana University told Dr. Smith that he was to work for two years on these two studies.

That is how the Schoolhouse Planning Division really got started in the State of Indiana. Not too much was done at that time, but a start was made. State superintendents since that time have attempted to do something about it. Years later Dr. Malan became State Superintendent of Public Instruction. He knew about the projects back in 1923 and 1924 and decided to set up a department, even though there was no law supporting it, and let the department make certain recommendations. That department functioned for a while under Dr. Smith's direction on a recommendation basis only—a very good way to get departments started in the State Department of Public Instruction. We have a Library Division that was established the same way. Right now we are establishing two departments in the same way. One is a research department and the other is in the field of curriculum and guidance. I hope before long that the legislature will provide enough funds for full-time departments and adequate staffs in these two fields.

The 1947 legislature passed a bill establishing a Schoolhouse Planning Division, but the Governor vetoed the bill.

Then Dr. Smith worked for another two years in an advisory capacity. A bill was presented in the 1949 session of the Indiana General Assembly. I want to give the credit

to one particular legislator in the State of Indiana, Clifford Funderburg at Huntington, Indiana, for getting it passed. He was the individual who wrote the bill, sponsored the act, and had much to do with getting it on the statute books. That gave legal sanction to the department that had been working for two or three years.

The mere fact that an act is passed is no guarantee of getting results from it immediately. It was about another two years before the State Board adopted rules and regulations concerning the school buildings in Indiana that gave Dr. Smith the power he needed in order to control school building construction in the state. Once those rules were passed, certain individuals did not want to abide by them. May I take a little time off to tell you how those rules were passed? Dr. Smith did not write them out and submit them to the General Commission of the Indiana State Board of Education. In the first place he called Indiana and Purdue universities in to help him prepare those rules and regulations. Then he called a committee of county and city superintendents in to review them. Then he contacted the Administrative Building Council and the State Board of Health to review them. A little later he called in the architects themselves. After practically all of the proposed rules and regulations had met the hurdles of the various agencies of the state government and the various organizations that were called in to review them, they were made valid rules and regulations.

Now they have the force of law. We brought along enough copies of the rules and regulations of the Schoolhouse Planning Division for every individual here. We are going to leave them in your hands, Dr. Seagers, so that the people assembled here can have the rules and regulations of the Schoolhouse Planning Division which permit us to operate. They are valid, according to Chapter 120 of the 1945 Acts.

You may get the idea that all that is necessary for you to do in the State of Indiana to build a school building is to get the approval of the State Department of Public Instruction. That is not true. There are other agencies from which you must have approval. One is the Administrative Building Council, another is the State Fire Marshal's Office, and the third is the State Board of Health.

Mr. Westover, I thought maybe you might forget to bring some of your own publications down, so yesterday afternoon I sent over to your office and I have three copies of each of your available publications for this conference. If you folks want to know what you must have in order to pass Mr. Westover's division, here is the publication *Building Rules and Regulations.* He has another book, *National Electric Code.* These will be available also during the conference.

People in education have been building school buildings for a long time, not as they pleased but with certain minimum regulations. These rules and regulations provide that schools in Indiana must meet certain educationally accepted standards which we believe are good. We are in a very critical era in school building construction, because we do not have enough money. Every month people come before the State Board of Education wanting exceptions to the rules and regulations.

The rules and regulations were attacked—in fact, the whole law was attacked to a certain extent—during the 1951 session and especially during the 1953 session. Three or four bills were submitted in the legislature this year to abolish the Schoolhouse Planning Division. Our division saw to it that those bills were pigeon-holed as soon as they were introduced, and there they remained until the session was over. I know Dr. Smith believes, as I do, that this act now has passed the trouble period. I do not expect much trouble during the 1955 session or during sessions from there on concerning the Schoolhouse Planning Division. We school people in Indiana have gone through the period of adjusting ourselves to a sound educational procedure. I know Dean Wright will have something to say about this, but I am going to mention it briefly and then he, in turn, can discuss it in detail.

We are going through a stop-gap period of school building construction in Indiana at the present time because the legislature did very little to help the situation. They passed only two bills concerning it; one was Senate Bill 123, which permits the use of the Common School Fund to buy holding company bonds. To my knowledge the four members composing that Commission have not been appointed as yet and there is some question as to whether or not a long legal fight will have to be fought in the courts of Indiana before any school corporation in the state can use it. It may be that some

buildings will be built under this act during the next few years. It is more likely that none will be built.

The other act was an act to clarify the 1951 State School Building Authority Act. This Act has been moving rather slowly. At present it is in the Supreme Court, and I do not think it will take the Supreme Court very long to settle the case, as it is not a very important case. This Authority is actually a holding company on a state level.

You really have only two pieces of legislation coming out of the 1953 General Assembly which helped school building construction. The situation is bad in another respect. The bond market right now is up. There are several holding company corporations today that could otherwise sell their bonds with ease. It is difficult to sell holding company bonds at 4 per cent, the legal rate. Perhaps they should go back to having 20-year bonds instead of 30-year bonds or to using the Common School Fund if at all possible.

So here we are in the rapid growth period, and with very little helpful legislation. This fall 34,000 more beginning pupils will enter Indiana schools than have ever entered the schools in this state before. The number of beginning pupils next year will be 28,000, so you have for the biennium 62,000 new pupils in addition to all of the others who will be entering our schools. We have a shortage of teachers. We need new school buildings to the extent of $62,000,000 even on a minimum school program. And we have no new way of erecting these school buildings. I want to compliment the Indiana School Survey Commission for working out a plan for solving this school building problem. The School Building Survey Commission did a good piece of work and, so far as legislation is concerned, was fairly successful. The Commission presented three bills in the legislature, one of which, the transfer bill, was passed. The Little Hoover Commission presented 18 bills, and I understand only one of those went through. One of the bills recommended by the School Survey Commission which did not go through, and which I think will go through eventually, is the provision of state funds for school building construction.

We have known for a long time in the State of Indiana that wealth and pupil population are not in balance. In other words, there are certain areas that have a concentration of

wealth and there are other areas that do not have the wealth but have a concentration of pupils. We have recognized that fact in the field of tuition support, in equalization, and in transportation. But as yet the legislature is not willing to recognize that fact, especially when it takes a considerable amount of money, in school building construction. But that time is coming—I am not sure whether it will be in the 1955 session or the 1957 session or the 1959 session—but that time is coming.

I want to close with this statement. I asked Anson Thomas before the session started whether or not he thought there was any chance of that bill passing in this session, and he said "No!" When I asked why, he said he thought it was a good bill but that the shoe was not pinching enough yet. Because we do not have stop-gap legislation, many children are attending school half days. Cecil Grayson has 1,800 youngsters in grades 1 to 6 going to school in half-day sessions. Half-day sessions will be more prevalent all over the state of Indiana. The shoe will gradually fit tighter. I am hoping that the legislature will solve that problem during the next session. I believe that, when the problem is solved correctly, Dean Wright, they will follow the recommendations of your survey.

PLANNING THE SCHOOL SITE

by

A. Carl Stelling

The Specialist and the School Building Program

In contrast with the generations before our time, when one was contented to live under the limited conditions then considered normal, school development has moved very rapidly. In fact, school design and development has outpaced housing in many respects.

This is evidenced by the forward strides that have taken place in the great school building program in progress all over the country during the past eight years and that are likely to continue for some time to come. Educators and boards of education have, during this period, taken advantage of the services of specialists among landscape-architectural, architectural, administrative, and educational consultants in mapping their school building programs. These specialists serve as the best safeguard in spending the taxpayers' dollars.

This is further exemplified in certain states, such as New York, in which the state education department has a very efficient, well-organized buildings and grounds division and a division of physical education, whose departments coordinate their work.

Since practically all school-building construction work is paid for with taxpayers' funds, it seems essential that these citizens be well represented and that their money be spent wisely. The investment, which generally amounts to at least hundreds of thousands of dollars, even millions, must be safeguarded. A pretty picture in the form of a plan or a perspective of a school building and its grounds does not insure good planning or construction, and its proper execution and completion is not guaranteed that way. Some state education departments have therefore stated, by statute requirements, that all plans for such work must be submitted to it for consideration and approval before bond issues are approved. The initial cost of executing a building program may appear to be

high, but actually it is reasonable when one considers the number of years (40 to 75) during which the finished product is expected to stand and be used. From the standpoint of student life, this minimum period of time represents two to three generations. It is therefore important that any school-building construction program be done as well and as economically as possible.

SERVICES OF A LANDSCAPE ARCHITECT AND SITE PLANNER

Today the meaning of landscape architecture, land planning, site planning, and, to a considerable degree, of town planning, community planning, and city planning are synonymous.

As applied to schools they involve the questions of (1) site location, (2) cost of land and development, and (3) determination and allocation of the specific uses of land, including means of access and communication, topography, drainage, vehicular and pedestrian traffic, open spaces, and areas for community uses. All these are coordinated to produce a unified development, which can be built economically and functionally to fulfill all the services as well as the athletic and recreational requirements which can be operated efficiently and which can be maintained with normal expense.

Site planning, as such, deals more specifically with the design and treatment of ground forms, detailed relationships of buildings to site, design of open spaces around buildings and recreation and other areas. The site planner for schools also has had to be a practical man. "Functionalism" is the byword. His work today is closely coordinated with all the architectural and engineering aspects, including the structural and the mechanical, of any major development from the "ground up."

Last but not least, the site planner injects into the planning and execution of the school site, through beautification and good design, the aesthetic aspect of every project he is connected with, and thus materially aids in molding the minds and bodies of our future generations of leaders.

PROCEDURE IN PLANNING THE SCHOOL SITE

The landscape architect is engaged by the board of education in any of the following capacities: Before the land is purchased he may aid in determining the suitability of prospective sites from a standpoint of (1) the cost of land, (2) the cost of development, (3) the suitability for development, or (4) the potentialities of the site as to facilities required. After the land is purchased he may prepare a master site plan in collaboration with the school building architect. This should indicate all the principal features of the site, such as: (1) the location of the building, including proper orientation, establishment of principal grades, and first floor elevation; (2) the layout of all approach walks, drives, service court, parking areas, etc., (3) the location of athletic and recreational facilities, facilities to meet community needs, etc.; and (4) the layout of lawns and planting.

COLLABORATION WITH THE ARCHITECT, EDUCATOR, AND OTHER CONSULTANTS

Close teamwork is required to do a successful job. In this day of "specialization" all of us have a basic knowledge of kindred professions. It can be said that many of us are legally qualified to plan an entire school project in all its phases, but are we competent to master architecture and structural, mechanical, electrical, and landscape engineering at one time? Technical problems have become far too advanced and the responsibilities far too great to undertake a major school-building program without taking advantage of the highly developed knowledge of design and technique each specialist contributes. Where the building becomes a major expense to consider, the architect usually becomes the chief coordinator of the project.

THE WORK OF THIS COLLABORATIVE TEAM

Pursuant to the completion of preliminary building floor plans by the architect, the site planner makes a template thereof and places it on the site. This is done in relation to (1) orientation, (2) grades, (3) existing streets, (4) pedestrian and vehicular approaches, etc. No building or site plan is molded until these basic requirements have been met.

This preliminary planning by no means settles the "partit." Many practical problems now enter into the plan. The mechanical and structural engineers come into the picture.

The first problem is "sanitary disposal." The existence of a city sewer can settle that, but a very high percentage of schools are built where there are no sewers, either sanitary or storm; nor is there water, that is, potable city water, available. You may have to dig for it by driving a "deep well" to guarantee a minimum supply. Of course this must be decided before a site is purchased.

Ground water can present a real problem. If the water table is high, it affects the whole building structure. Test borings determine where it is to be found, and the water level regulates the depth (and design) of septic wells and leaching fields, all of which control the elevation of the building provided pumps are not used. The structural engineer likewise is concerned with the bearing quality of the soil, including water.

All this still does not settle the elevation of the building. The site planner, having worked with the architect and the mechanical and structural engineers, now must consider surface drainage around the building, as the surface water must drain away from it. He is faced with the "controls" set forth by the other three specialists and, in turn, must consider (on hilly sites) minimum and maximum gradients. A minimum grade of .5 per cent is considered fair for smooth paved areas to guarantee surface runoff, but turf areas should have at least 1.5 per cent pitch. Walks should not have more than 6 per cent pitch for safety, and 4 per cent is really much better, particularly where winter ice conditions have to be considered. If, therefore, the building is 100 feet from the street and a direct approach walk to it is required, the street establishes the control grade for the building, which would be four feet higher at a 4 per cent grade, unless steps have to be resorted to. Steps are avoided where possible.

All this may seem very technical, but it plays a very important role in "getting a start" in the planning. Once these problems have been settled, the various specialists can continue with "progress drawings" for a while before getting together again to match technical hurdles to be overcome to complete a well-integrated set of working drawings suitable

for public bidding and ultimate successful completion of the school plant.

FUNDAMENTALS FOR SCHOOL SITE DEVELOPMENTS

School sites vary in size, shape, and contour to such a degree that no set standard of development may be followed in their planning. After the selection of a site, many factors and requirements must be considered before the development may be crystallized. These may be classified principally as follows:

A. Type of school under consideration
   1. Elementary school, including nursery or kindergarten (grades K-3; K-6; K-8)
   2. Junior high school (grades 7, 8, 9)
   3. Senior high school (grades 10, 11, 12)
   4. Private school in any of the first three grade classifications
   5. A combination of the first three grade classifications
   6. Central rural, regional or consolidated, suburban, or city

B. Location of building with future extensions
C. Pupil station expansion anticipated
D. Means employed in transporting students to and from school
E. Foreground and setting
F. Approaches, including walks, drives, parking and service areas
G. Grading and drainage of land, ground water, etc.
H. Recreational facilities, community use
I. Irrigation
J. Planting
K. Maintenance

With the aforementioned fundamentals in mind, the site planner prepares a master or preliminary general plan which has these considerations incorporated, thus insuring the proper present and future development of the entire site.

Athletic and recreational activities have become an integral part of the school curriculum, and definite space requirements for them must be considered. Students of various ages have diverse interests. Kindergarten and primary grade students require protection, and therefore their play areas should be close to their classrooms and completely enclosed by fencing. Junior and senior high school students enjoy many sports activities, including all of the major sports as well as intramural.

SPACE REQUIREMENTS AND STANDARDS FOR SCHOOL SITES

In about 1936 to 1937, Harold S. Bates, then principal of the Norwood High School, Norwood, Ohio, and I collaborated with Dr. N. L. Englehardt of Teachers College in setting up a score card and standards for the development of school sites. These were published in the *American School and University Year Book* at that time. Generally speaking, the fundamentals contained therein still hold true, but the standards for school sites have changed with the times. In 1950, the Council of School Superintendents' Committee on Recreation and the New York State Association for Health, Physical Education, and Recreation, the New York State Public High School Athletic Areas, and the State Education Department's Division of Health and Physical Recreation, published a *Work Book on Facilities* for physical education and recreation. This office had the pleasure and privilege of preparing illustrative designs for this book for outdoor physical education and recreation areas, in which we endeavored to establish new standards for outdoor facilities for school sites. These new standards indicate the need for far more extensive facilities for all schools than were required less than 20 years ago. The following represents a quotation from this work book, giving the acreage for the various schools.

A. For Urban Areas:

Neighborhood Park-School (Elementary): 10 acres or more depending on population; an elementary neighborhood school-recreation building in a park setting; service radius, ¼ to ½ mile.

Community Park-School (Junior High): 25 acres or more; a centrally located junior high school in a park-like environment; service radius, ½ to 1 mile.

Community Park-School (Senior High): 40 acres; a centrally located senior high school building in a park-like environment; service radius, 2 to 3 miles.

Major Park: A large park area which provides facilities in addition to those located in the neighborhood and community center; the number and type of which will depend upon the size, need, and economic status of the city. It may include one or more of the recreation-park type buildings, athletic fields, a golf course, a bridle path, a water area, an outdoor theater, a swimming pool, botanical gardens, a nature area, an arena, a stadium, and similar facilities for large-scale activities.

B. For Rural Areas:

Neighborhood Park-School (Elementary): 5 acres or more; a centrally located neighborhood nonconsolidated elementary school building in a park-like environment to serve the entire rural neighborhood.

Neighborhood Park-School (Elementary): 10 acres or more; a centrally located rural consolidated school building in a park-like environment.

Community Park-School (Elementary and Secondary): 25 acres; an elementary and high school centralized building, or buildings, in a park-like environment to serve the community, which includes both the village or town and the surrounding open country.

C. For the Region:

Region Parks and Parkways: Park located outside the city limits, including country, state, and federal park areas in the region.

Forest Preserves, Camps, Beaches: Specialized and supplementary areas to be provided for use in the region.

In building the Neighborhood Park-School and the Community Park-School, whether they be of the elementary or

secondary type or whether they be located in a city, village, or central school district, some provision ought to be made for part-time use of outdoor areas by out-of-school youth and by adults. Total acreage allotted to these schools contains sufficient room for activities peculiar to these groups. The Neighborhood Park-School, for example, may well contain two or three tennis courts and a hard-surfaced, multiple-use court for volleyball, basketball, handball, etc. These areas will lend themselves to use by both school and community. In the larger Community Park-School (senior high) a greater amount of space will be available for community use. Areas serving both senior high school pupils and adults in such activities as tennis, baseball, softball, skating, skiing, horseshoes, outdoor volleyball, and basketball, and perhaps a swimming pool may be planned to mutual advantage.

REFERENCE MATERIAL REQUIRED TO PREPARE WORKING DRAWINGS AND SPECIFICATIONS FOR CONTRACT BIDDING

Reference material required to prepare working drawings and specifications for contract bidding includes a topographic and boundary survey and a topographic map to be preferably at 1 to 2 feet contours to include boundary streets, all existing utilities, existing structures, dry wells, fences, streams, rock outcroppings, wood areas, and all other major features. Specimen trees likely to remain should be included, as well as any other physical characteristics considered pertinent to its development.

AWARD OF CONTRACT OF EXECUTION OF WORK

Needless to say the contract documents which comprise all the general conditions, the various types of insurance and bond requirements, the bid proposals, and the specifications play a very important role in insuring for the taxpayers who have voted for the school and site development that their tax dollars will be well invested for the benefit of the community as a whole. Aside from the customary legalities, there are certain fundamentals which our office has established successfully, so that the school site will be properly executed on schedule in order that pupils may benefit fully from the facilities as soon as the school building is ready to open its doors.

The usual method of figuring the building area is on the basis of cubic foot cost as applied to the building, with so much money thrown in for the grounds. As every school site develops in character and size, we have to establish a budget for the site development. Most of the time we deal in acreage, and we have a figure of from $5,000 to $10,000 an acre as the usual cost for site development. Due to the great intensity of use on most school sites today, which means higher density, the $10,000 figure is more nearly correct. The $5,000 figure per acre is more applicable to rural schools rather than to urban areas.

Establishment of the budget design insures execution until bids have been taken. Since the completion of the entire program remains an open question at all times, we have established a system of subdividing the school areas into two categories, namely, Area A, which is the area around the building proper, taken up mostly with walks, drive, parking area, service area, and lawns and planting, and which cannot be completed until the building itself is almost completed; and Area B, the athletic and recreational area, which is normally away from the building and can be developed separately and uninterruptedly during the course of construction of the building. If the entire site construction is made a part of the base bid under the general contract for the building, with an alternate deductible allowance for its cost reflected in the bid for the entire site improvement as well as for Areas A and B separately, one can tell immediately from the bids whether or not this work can be included under the general contract or whether portions of it must be deleted, with readvertisement or a new referendum from the voters required if additional funds are needed.

If the funds are adequate, the construction of Area B containing all the athletic and recreational facilities is immediately authorized, so that its completion and readiness for use will coincide with the completion of the building. This is a very important point, since turf areas should not be used until one year after seeding in order to permit the roots to become properly established and to get lasting value out of it. The driveway and walk approaches, etc., do not have the same seasonal limitations and can be done just as soon as the building construction permits.

DEVELOPING EDUCATIONAL SPECIFICATIONS

by

Paul W. Seagers

In the past architects have not had much help from educators. Actually what we have done is to tell the architect that we need a high school or an elementary school of so many rooms or to accommodate so many pupils. Then we have left it up to the architect to decide how that building should be built. Although that has been rather unfair to the architect, he has actually done a pretty good job through the years. The buildings have been fairly flexible in spite of the fact that we have had many changes in our programs. Probably the reason we have not been able to help the architect is that we have been a little afraid to get into what we thought was his territory, and in some cases, no doubt, the architect has been somewhat jealous of his territory and did not want us to help him. Times have changed and the better architects now are exceedingly grateful for any information that we can give them in regard to the educational program that we want in the building. This information, when compiled, is called "educational specifications." This is in contrast to the building specifications which the architect makes up.

The educational specifications consist of a great number of items to acquaint the architect not only with our school needs but also with the community in general. Now, what are these items? Can we get copies of them? Well, it is extremely difficult to get copies of educational specifications. Probably one of the best that I know of, to date, is put out by Janesville, Wisconsin. It is a fairly large volume. This is not complete by any means, but it is far beyond most things of its kind.

There is also Bulletin 15, entitled *Data to Be Furnished Architects by the Board of Education,* published by the Association of School Business Officials. This includes some educational specifications, together with the amount of money that is available for equipment, for site, for development, etc.

It lists the items of information which the board of education should furnish the architect, including the topographical map, the results of test borings on the site, and information as to where the utilities are located. In all, this bulletin gives the data that the school system, including the board and the administration, should furnish the architect. I commend it to your use.

Now let us consider the educational specifications. First of all, these should contain a very simple statement of the philosophy of the community. There is a philosophy that permeates every community, but it is difficult to crystallize it into something that anyone can recognize. Probably the only way is to get some interested citizens to sit down and formulate a clear statement. These people must come from all walks of life in the community.

The next thing we should furnish, I believe, is a short statement of the background of the community. In other words, what has been the relationship of this community to education? How was education started in the community? Were the first schools private schools, or were they sponsored by the church, or how did they get started? This information often has a strong bearing on the type of school program and school building that you want in a community. What is the cultural and industrial background of the community? Is it a stable community, or is it a transient community? What has been the history of the graduates of the educational system of the community? Have they gone into higher education and then into various fields, or have they gone to work before they graduated from high school or even from the eighth grade? All these things are important because the architect must know the type of program needed.

The next thing to be furnished the architect is the philosophy of the school. Before you can determine the philosophy of the school you must know the community background. The school staff will need many meetings to determine the philosophy. What is the purpose of the school system? Is it to train people to make a living or is it to train people to make a life, to live a useful, happy life, to get along with other people, to understand world problems? All of these things enter into the philosophy.

Every department should also make a statement as to the aims and objectives of that department. Why are you teaching science in a school? Is it offered for everybody? Are you teaching the brand of science that everybody should have or are you teaching a specialized science that can be used only by those boys and girls who can understand nuclear fission? These questions are important. Why are you teaching social studies? What is home economics? Is it for those girls who normally cannot pass the other types of courses in the school, or is it for everybody in the school? Is homemaking to teach girls and boys how to live more fruitfully, how to be happy in their living, how to adjust into a complicated life? We should state the purpose of teaching each field or area. We should also discuss the cultural development and the cultural and recreational needs in this particular community. In many places the school is the cultural center. In many places it is the recreational center. I have been in school systems where there were no motion picture shows in the school district, and motion pictures were shown in the school auditorium. Why not?

The next thing is to determine the total program—that is, the over-all educational, cultural, and recreational program which the school is going to operate. This includes the subjects or courses that we propose to teach. One way of finding out whether these courses will be of any value to the school or not is to circularize the graduates and drop-outs for the last five or ten years and get their ideas of which subjects were valuable and which subjects were not. We might be surprised.

We are one of the few nations in which a knowledge of some foreign language is not required in most of the schools. Frequently we hear, "What's the use of a foreign language?" I'll wager that many of the boys who were in the last World War wish they had had a little smattering of a foreign language. I wish I had had more of it—the very foreign language that I need in my work is the one that was abolished from high school in the First World War, when I was in high school. I am having to learn it now the hard way. We should also determine what role this school system is going to play in the cultural side of the community. Most people do not realize the role the University plays in the cultural life of this

whole area—we are too close to get a proper perspective. This is a real cultural center, not only for Indiana but for the whole Midwest. The role that the school is going to play in the development of the community is a very important factor.

The recreational life of the community is also very important. We are planning a junior high school with bowling alleys in it, believe it or not, and a junior high school with a target range in it. If boys are going to use guns, and I think they will use them in our civilization for a good many years to come, let us teach them to use the guns properly, so that they can use them safely for recreation. Why not a target range? Why not a bowling alley? Bowling alleys are perfectly respectable today, thanks to some of our big companies which manufacture bowling equipment. They have popularized the game, and today bowling is considered one of the fine types of recreation. Many schools have bowling tournaments and play-offs just as we have in basketball here.

Once we determine the cultural relationship of this educational system to the community, we can lay out the educational program and determine the type of curriculum we need. I like to think in terms of program rather than curriculum; program is a broader concept than curriculum. After we have laid out the proposed program for years in advance, we can determine the areas needed. There are both educational areas and service areas. In other words, we can make the allotments of space for various departments and their services. That is the job of the administrator or consultant and is not the architect's job. We should determine what space we want for every function, and then relate those areas one to another. In other words, where do we want the homemaking area? Do we want it isolated from other sections of the building where we can cut it off for use at night as well as for teaching purposes in the daytime? Where do we want our shop areas? Do we want them in the middle of the building, at the end, or entirely away from the main building? Where do we want those areas that will serve the community more directly, such as the auditorium, the gymnasium, and perhaps the cafeteria? What are the relationships of these areas to each other and to the administrative area?

In other words, after the space has been allotted for these areas, the areas must be properly related for the program that

has been visualized. After this, the various special features desired should be planned. What are special features? They can be educational, recreational, or cultural. How is audio-visual education going to function in the building? Is it going to be housed in connection with the library? In this connection, I suggest you read Margaret Rufsvold's book *Audio-Visual School Library Service.* I have a drawing of a new relationship between the library and audio-visual education in this book. In connection with audio-visual education I think there should be an area where people can listen to records at listening tables or listening booths, where they would not bother anyone else. Why should fine recorded music always be listened to under the direction of the classroom teacher or the music teacher? Why can't the records be taken home and played if proper equipment is available, just as books can be taken home? How about motion pictures or film strips? Why can't we have a place where youngsters can look at them on their own? Most educational pictures are important enough to review at least once or twice. It is not possible to get it all the first time. Also, why not have a storage and repair room near the library? What about previewing rooms for the teachers? The teacher should preview the film in order to be properly prepared to use it. If youngsters are absent the day the film is shown, how are they going to see it? Why not have a small previewing room where the teachers can preview films, where youngsters who have been absent can view them, and where youngsters who want to see them again can review them?

These are special features, and there may be hundreds more. How about a conference room, a storage room for reference materials, and study areas for good core curriculum rooms? What is the core curriculum room? We know that a core curriculum requires more square feet per person than does an average classroom. It is rather difficult to get a good core curriculum room into less space than 1,200 square feet.

All of this information needs to be recorded. The architect should not be expected to get it for himself. We should also determine other special features. What type of equipment is needed, and where is it going? What equipment should be built in, and what equipment should be purchased? What are the sizes of the equipment to be purchased, and

how much wall space do we need for this equipment? These are all special kinds of information that the architect should know. He should not have to guess.

Now the next thing we should furnish the architect is sketches. That does not mean that we are going to do the architect's job. But if any ideas can be conveyed to the architect by means of sketches, drawings should by all means be made, even though they may be rough. Sketches of proposed layouts, clippings out of various newspapers or magazines, overlays, or drawings are all important. We should keep a good scrapbook actually made up of all these ideas and classified according to subject areas. When the architect gets that scrapbook he has a lot of reading, but he ceases to play a guessing game.

Let us take the Janesville specifications. Here is the proposed sketch for the health suite in the new high school. Although it seems to be an excellent job, it will not necessarily remain in that form. It is the one way of conveying to the architect some ideas of the needs. The building may not end with the suggested arrangement for an isolation area in the health suite, for example, for it may be that the architect can find a better way of solving the problem. The same thing is true of the arts and crafts area and of many other special areas.

Now let us look at the educational specifications for the music department at Janesville. The written educational philosophy concerning music in the schools states: "All value derived from music participation must originate through oral response. All educational benefits, including those which are an outgrowth from a music group participation . . . are possible only by an oral realization of individual and group processes. This can be measured only by performance, whether it be rehearsal or concert." After stating their philosophy, they give the types of activity that they propose, and then the space requirements, the orientation, and special features. Music rooms should be planned so that the director does not have to face bright lights or windows. Suggestions are also made for storage, for a music library, for practice rooms, rehearsal rooms, and a band rehearsal room, for a band office, and for recording storage.

We can do what Janesville has done. It will take a little effort. There is no question about that. And it will take a little interpretation to the architect. Not only that, it will take some screening, because if we give the teachers all the space they want we may get a building three times as large as we need. It is going to take some such authority as an administrator not the architect, perhaps in consultation with others, to arrive at realistic space allotments. While we know that not all ideas in the educational specifications will get into the school building, more of them are likely to be used if the educational specifications are planned properly. If some suggestion is not used, the individual or department that made it should be notified of that fact, with a reason given for the elimination of that feature.

As I said before, the interpretation of this to the architect is a big job. This is the job of the consultant. This process is complicated, but we are putting up buildings that are complicated. We say that it takes time. It does. But a year or so in planning is nothing compared to the 60 or 70 years the buildings are going to last. We get more educational value for our money when we plan wisely.

I commend this approach to school building planning: First, determine your community background. Second, determine your educational, recreational, and cultural needs, and crystallize your philosophy for the school as a whole. Third, determine the philosophy for each subject field. Fourth, set up a proposed long-term program. Fifth, allot areas or space for each department or subject field. Sixth, list the special features necessary for each educational and service area. Seventh, submit sketches, drawings, clippings, photos, and any other visual materials that will help tell the story. Together, these should form a scrapbook of information which will be helpful to the architect.

DEVELOPING EDUCATIONAL SPECIFICATIONS

Discussion

Discussion leaders: Robert W. Harris, Mrs. John E. Fell, and Harold Maurer

MR. HARRIS: I wonder, Mrs. Fell, if Kokomo has had any experiences that you feel would be of help to the group.

MRS. FELL: I think of nothing right now. We are just completing a very lovely building which will be occupied in September for the first time and we are planning a long-range building program, hoping to take care of the years to come. I believe the *Indianapolis Star* has kept you aware of the problem within our county, which has both directly and indirectly affected our Board.

MR. HARRIS: You are not operating as a consolidated unit yet?

MRS. FELL: No, we are not. Of course, it has been a matter of discussion—a great deal of discussion since the middle of February. There has been no final decision made pending some decisions of the State Tax Board. We hope not to have an election until the regular election next May concerning that.

MR. HARRIS: Well, I am glad to hear of a school community that doesn't have any great problems.

MRS. FELL: We have many problems, but I don't think of any one that is any more pressing than the others.

MR. HARRIS: Mr. Maurer, I know this was somewhat of a shock to you, coming here today and finding out that you were going to expound on school buildings. What has been your experience with boards? Have we been too unreasonable?

MR. MAURER: Before answering that, I was just wondering whether the reason it is difficult to hear well in this room is because of the failure of us architects to design the room properly or because of the failure of the educators to teach us to speak with one of these microphones or because of the failure of the educators to know how to operate one

of them. I was just thinking of our predecessors who designed these buildings without the benefit of educational consultants. We need you to help us build the buildings for the future generation. It is like all things in the world today, it is a complicated problem; everything has to be cooperative.

Our speaker this morning indicated the number of specialists involved in the planning of school buildings, from the inception of these buildings in someone's mind, which I presume is that of the board or the taxpayers or the P.T.A., through the hands of the administrative staff and probably of an educational survey team and into the hands of a whole group of technically trained people who have to work together. I was glad to hear Mr. Stelling bring up the subject of site planning. It seems to me that many schools are handicapped by not having foresight to begin with. Foresight would sometimes eliminate the loss of thousands of dollars caused by selection of a poor site. You should coordinate all of these things at the beginning. You should tell the architect how many dollars you have and how many dollars you can get hold of. Generally these are two irreconcilable things—what we want and what we have.

Here the first compromise begins. You compromise the quality of the building to fit the budget. You either go out and beat the bushes and raise more money or you build a number of rooms now and hope that somehow you can put the finishing touches on them later on. It is an irreconcilable situation. I can recall only one or two instances in which a school city had enough money to build what it thought it would need. Unfortunately, conferences like this cost the taxpayer money. I am not saying that in a derogatory manner, but it is so. Superintendents come to these meetings and they hear the experts talk about the fine things that can be put into buildings. They go back to their communities and they want every one of those things. Then they discuss them back home and send the teachers out to look at new buildings. Then the teachers come back with a list of new gadgets but not the dollars with which to get them. I tell people they need a magician, not an architect, to reconcile all of these things.

This all leads up to the question: Are you going to build a building complete with the things the educators think should go into them? or Are you going to build a stripped down build-

ing to meet crying needs for space for a large number of children? I am inclined to believe in the former. If you have only money enough to build 10 rooms and you need 15 rooms, build the 10 and build them complete, because it will be easier to find the money to build the other five rooms later on than to find the money to go back and equip the first 10 rooms. I have seen too many of these so-called stripped down buildings. Then somebody comes along and says, "Over there they built a building for $15,000 a room but you say it costs $30,000. Why can't you do it for $15,000?" Well, you can't save in the building itself; you have to have a roof and a floor and a heating plant and windows and so on, and all of the educational aids that are required. There seems to be no place to take it out unless you take it out of the site and just let the weeds grow around with no drives, no walks, and no playgrounds. Unfortunately that happens too often.

MR. STELLING: Well, I agree with most of the things Mr. Maurer had to say except his suggestion that we should forget the site. We all seem to be very tax-dollar conscious. I heard a discussion at a town meeting the other day relative to a school referendum on whether or not a new school should be built. Finally somebody said, "Who is worried about money all of the time? You are here to educate your children. Do you want to educate them, or don't you?" That is really what it amounts to. Do they need these facilities, or don't they?

We landscape architects are usually engaged as consultants with the architect in his program. We have a system of dividing up the site, as illustrated outside on the drawings in the hall, into several separate areas. The area around the building is usually the service area, the approach walk, and the service drive. You have to have these drives and walks to get to your building. The front lawn may have some planting. Most of the buildings today are pretty well designed and shouldn't be overplanted. True enough, athletics are an essential part of physical education and therefore an essential part of the growth and well being of the children. Everybody recognizes that, but you may not have the money in the initial budget to complete all of the work you want to do.

If you are not sure whether you have the money or not, you should incorporate the entire site development in the general construction of the building, and then, as an alternate

deduction, ask for an allowance for the cost of the site work in the base bid. Then you know how much that is going to cost. You can get an item by item breakdown of the cost of area A, the lawn and service area, and the cost of area B, the recreation area. If you do not have the money for both areas, it is better to include area B first and have your baseball diamond, your football field, and so on done concurrently with the building. There is a very definite reason for that because, first of all, the contractor doesn't need that area for his shacks or his building materials. If you go ahead and develop area B so that it is ready for use when the building is ready, area A can then be developed as soon as the building has progressed sufficiently for you to go ahead and put in the walks and finish grading and that sort of thing. By the time your building is finished, your grass will have had about a year to grow and will have established itself in the play areas before it is used.

MR. HARRIS: Well, we have rather an interesting situation in New Albany. We have had for the past four years a continuous building program. We happen to be in a defense area, and our classrooms are now running at an average of about 34 pupils per room in the elementary schools. The condition is not critical because we have been ripping out dining rooms and toilet rooms and converting them into classrooms. Of course, we are reaching the point where this cannot continue.

We are fortunate in our community in that our school boards woke up 15 or more years ago and began acquiring land as it was available. We are initiating a program that we feel is going to be unique in southern Indiana, at least in that some 27 years ago we completed a new high school and we began acquiring land in back of it. We had a top-notch architect-engineer on that job, and visitors are amazed to find that that building is as old as it is. The building has been enlarged and land has been acquired in back of this building so that now we have about 30 acres. At the extreme east end of this plot, the opposite end from the site of the present high school building, we are planning a junior high school building. Not more than 500 yards from the east end of this lot—the site of our proposed junior high school—stands the oldest public school building in our system, erected in 1915. The plot that this building occupies is not more than about three times the

actual exterior measurements of the building itself. The depression came along and ground that was available at the time was not bought because we were actually cutting school teachers' salaries. This ground has since been built up so that the children have a playground consisting only of a blacktop street next to the National Cemetery. It gives them a long area, but not a very pleasant one. The street is blocked off every day, and they play on the ground around the school right up against the school walls.

With this new junior high school program, we will have an auditorium so placed on the junior high school plot that it will be conveniently located. It will be on the corner of the plot closest to this grade school, so that a community auditorium will be available to them. The auditorium in the present building has been absorbed into classrooms. This old building originally had eight classrooms. It means that we have a situation that is a compromise—the location of the old Silver Street School is deplorable in that there is no playground space to speak of and that there is no auditorium, but there will be an auditorium with a seating capacity of some 700 in the new building not more than 500 yards from there. The junior high school, of course, will not be as complete as we would like to have it, but we are fortunate in having, at the opposite end of town, a building that is now devoted to the colored school population of our city. We pick up the pupils by bus from all over the community and bring them to this school building. Of course, it is on a voluntary basis now; most of our colored children prefer to go there.

We feel that in another six or seven years the colored children will be absorbed within the elementary school areas in which they live and we will be faced with finding a use for this building which is also having classrooms added at the present time. We propose to have a west end junior high school in that building. We anticipate an enrollment of about 800 pupils in each of our two junior high schools. In the west end of town, at this Griffin Street Colored School, we have been fortunate in being able to purchase land that nobody else wanted. This will make an ideal amphitheater site—it is a perfect horseshoe in shape. It is going to make a remarkable school site. At the opposite end of town we feel that, in a matter of three or four years, we will have something that

will be unique in Indiana in that it will approach the collegiate ideal of a campus with a group of buildings. Our architect has recommended to us the erection of separate buildings. He proposes an academic building, in which ordinary classroom recitations in liberal arts and science courses will be carried on. Directly in back of that he proposes to set up a shop building, combined with a heating plant, so that the noise and confusion and dirt of shop operations will be separated from the other classrooms. He also proposes a separate building for the auditorium and cafeteria-dining room. We think that we are making a rather radical step in doing that. Personally, I am not convinced that it will be as satisfactory as putting it in one building. The architect says he thinks it will.

Mrs. Fell and I are amateurs in this business of education, so we are going to abide by the recommendations of the professionals. I believe that all of the board members here will agree with me that, under democratic principles, a board member here in Indiana who serves a limited number of years can't be expected to exercise anything but the common sense nature has endowed him with and the benefit of whatever experience he has had. We have to rely upon the expert. We are fortunate in that we have had Dr. Seagers advise us. We have relied on our architects to give us the proper mechanical and physical plants to get a program initiated. I feel that a conference such as this is a step in the right direction.

We have been very fortunate in our community. We put up a new school building which opened in 1950 in which we segregated one wing for a new auditorium-gymnasium with the idea of taking care of church basketball leagues and similar civic club meetings. For five years wherever I was asked to speak I invited the pupils to use these buildings, because we had in this community about $3,000,000 worth of school facilities and you just can't justify locking up a place like that at 3:00 in the afternoon. The community has responded now to the point where I understand we have to have a designated program and allotment of time for the use of that building. We feel that is an important bit of public relations.

We have found that if we let the public in on discussions of the building program, we get very little criticism. We have also picked up a following of semiofficial school board members

who turn out, at the drop of a hat, to defend anything we want to do. We feel that as long as we can get the community to go along with us, we can enlarge our curriculum and can offer more to the community. Our success has been just a matter of taking the advice of the best technical brains that we could get, and when we finished the job, it is the consultant who has done the job. All we have done is to raise the money and provide for the payment of the bond issue when it comes due.

MR. WILSON: I suspect that some of these people in the audience might like to ask some questions.

QUESTION (from audience): There is just one question I would like to ask the speaker who made such an excellent presentation on the requirements for recreational facilities. You emphasized the recreation phases, and some phases of community use. Would you care to go into uses for that expanded school plant other than the recreational uses?

MR. HARRIS: Well, we have civic meetings. All of the civic clubs throw joint banquets there. We have various clubs. Southern Indiana, Inc., an organization made up of forward-looking citizens of southern Indiana who are imbued with the idea that the entire resources, the very soul, of southern Indiana should be advertised and exploited, held a meeting at the S. L. Jones School. We find that the building has a great many more uses than we had anticipated at first. We started out with the idea that these church league basketball games could be held in the high school gymnasium, which seats 4,000 or 4,200 people, but the building was too hard to heat and took too much work to keep it cleaned up and ready for classes the next day. With this smaller gymnasium, with a seating capacity of about 600 in the bleachers, we could provide a small community-size gymnasium that would fill a community need. The need appears to be even greater than we suspected, and the building is now in constant use.

I recall when the president of Kiwanis International, Don Murdock, of Toronto, came to New Albany two years ago. Kiwanians visiting us from Lexington, Kentucky, from Bloomington, from Evansville, and from many other places attended that meeting. We had an overflow crowd. I don't know where else in the city we could have held that meeting. The kitchen is so set up that professional caterers move right in. We

have a kitchen there but it is used for serving rather than for food preparation. We have found that such things have done much to develop good will on the part of the public. People come into the building, and they realize that it is their building.

QUESTION (from audience): I wonder if Mr. Stelling would be willing to expand a little further, showing what additional activities are needed to call for additional ground.

MR. STELLING: I think we are all familiar with the summer recreation programs. They are a wonderful thing because they put the school grounds to use in whatever constructive way the community wishes. Most of these things are organized according to different age groups. There should be supervision and scheduling of the use of the grounds in any activity, whether it is organized softball, baseball, day school for small children, or general activities. All those things should be and can be scheduled or channeled through the school system whether they are of general civic interest, of local interest, or of school interest. Does that answer your question, sir?

QUESTION (from audience): Yes, there is one thing that comes to my mind. I know of a community which put out about six acres of crops a few years ago. They showed the children how to prepare the soil, how to plant it, how to tend it, and how to harvest the crops. Then they canned that product and used it for the cafeteria program later on. That is a combination of education and economics. Now I wonder whether some of these activities would come into the picture in demanding greater areas.

MR. STELLING: They do, they definitely do. I think, however, the trend toward growing vegetables, etc., in the suburban and urban areas has diminished as the war situation has diminished. We were much more conscious of it during the war years. In the rural areas, however, where there is a great interest and need for that sort of training and where more land is available, I can see where that is a matter that should be given consideration.

FORM IN EDUCATIONAL ARCHITECTURE

by

William W. Caudill

What makes one schoolhouse look different from another? Is it because architects do not like to copy? Is it because the school administrators want something different? Or is it because we have no set styles for educational architecture? These are not the reasons, at least not the true ones.

The first-rate creative architect will not stoop to mere copying. The top-flight school administrator does not want something just to be different; he wants a better solution to his space problems. And there is no set style of educational architecture. Thank goodness for that, because styles as we think of them today are, in essence, nonfunctional slip covers —even the modern style, which in most cases represents a dead architecture. Dead as Colonial!

Our best schools today live to do what they are supposed to do. They serve the pupils as do the teachers. A living educational architecture is organic. It shapes itself. It creates its own form by fulfilling its own requirements. New requirements necessitate new forms. That is why schoolhouses today are so radically different from those of only 10 or 15 years ago. Education has demanded new requirements of its architecture. But if all school systems have the same educational program, then why can't all schoolhouses look alike?

That's the trouble. School systems do not all have the same educational program. The programs differ tremendously, depending on the number of pupils involved, the characteristics of the community and its desire and ability to pay for education, the teaching talent, the organization of the teaching setup, and many more factors. Even the climate affects the program.

But there are many reasons other than education why schoolhouses cannot look alike. It was mentioned that the climate could affect the educational program. Most assuredly it affects the architecture. But so do the structure, the land,

the neighborhood, the lighting and ventilating system, esthetics, and economy. Consider them one by one:

Climate

A palm tree of Miami is never found in Sioux City. For the same reason architecture for Florida should not be transplanted in Iowa.

Structure

A building structure planned to make full use of advantages peculiar to steel construction cannot be built well of concrete or wood.

Land

A building designed for a sloping site cannot usually be adapted to function adequately on flat land.

Neighborhood

The street patterns which form the approaches and the entrances of the school play a major part in shaping it.

Light and air

A system of natural lighting and ventilation designed for south orientation will seldom work with any other orientation.

Esthetics

A change in a major building material or a slight change in a ceiling height will definitely disturb a harmonious architectural composition.

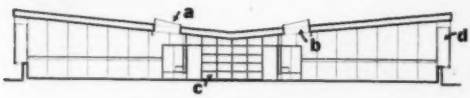
Economy

A sumptuous, luxuriously equipped school built in one community obviously cannot be duplicated by another community with a more limited budget.

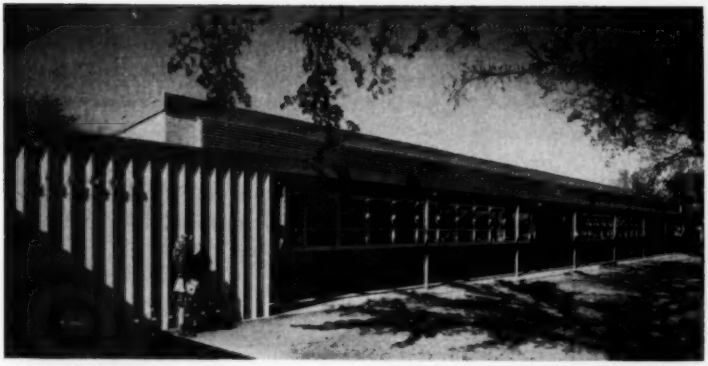
A beautiful, functional school plant brings all of these factors into equilibrium. Change one factor and all are affected. That is what makes one schoolhouse look different from another.

The following case studies will show how variation in requirements produces a variation in architectural form. These schools are scattered from the Mexican border to the Kansas line. They are all different; all were designed by the same architects, but for completely different sets of conditions. A study of these schools will show that architectural form grows out of the requirements of education, climate, structure, land, neighborhood, light and air, esthetics, and economy.

FAIRVIEW ELEMENTARY
ELK CITY, OKLAHOMA



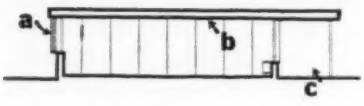
a. Continuous skylights
b. Multi-function corridor (also ventilation duct)
c. Egg-crate glare shields
d. Large vertical sun baffles (east and west)



HUSTON ELEMENTARY
BLACKWELL, OKLAHOMA

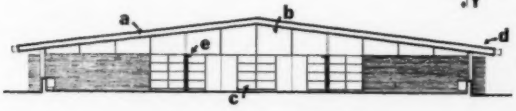
a. Outside corridor and sun control
b. Light reflecting louvers
c. Slot for equalizing air pressure
d. Supplementary hot water convectors
e. Radiant floor panel heating with copper tubing

WASHINGTON ELEMENTARY AND HIGH
STILLWATER, OKLAHOMA



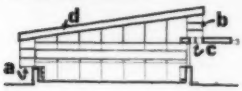
a. Light reflecting louvers
b. Steel beams, wood purlins, and two-inch decking
c. Outside corridors

WASHINGTON ELEMENTARY
CLINTON, OKLAHOMA



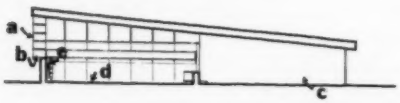
a. Umbrella roof (no roof breaks)
b. Light enters through glass gables
c. Multi-purpose corridor
d. Sun control by projecting eaves
e. Cove heating units
f. Economical low-perimeter plan

WESTWOOD ELEMENTARY
STILLWATER, OKLAHOMA



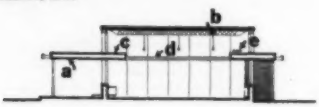
a. Horizontal air flow window
b. Sun control baffles
c. Air flow intake
d. Steel beams and wood joist roof

WILL ROGERS ELEMENTARY
STILLWATER, OKLAHOMA

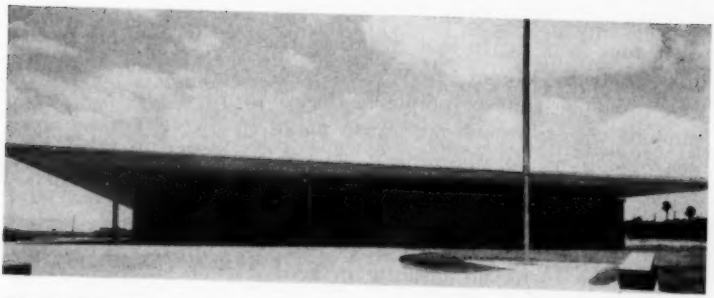


a. Horizontal sky shields to reduce glare
b. Ventilation slot
c. Covered activity area on south
d. Radiant floor panel heating
e. Supplementary heating convectors on north

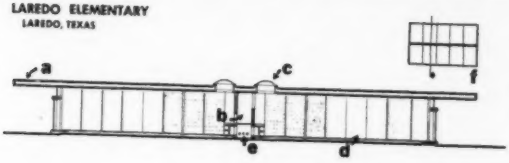
ELEMENTARY AND JUNIOR HIGH
ALBANY, TEXAS



a. Outdoor corridor and sun control
b. Inverted sun-control overhang
c. Steel beams, steel joist, and gypsum deck
d. Integrated natural and artificial lighting
e. Accessible space for utility runs



LAREDO ELEMENTARY
LAREDO, TEXAS



a. Overhangs over peripheral corridor
b. Sound filtered ventilation duct
c. Plastic lighting dome in lift-slab
d. Teaching space dividers

NEEDED RESEARCH

by

Darell B. Harmon

In his talk last night, Mr. Caudill very masterfully demonstrated, in one area of school planning at least, what can be accomplished with sound and consistent research in advancing our schools. He showed us how a very serious inquiry into the design principle that "the problem defines form" can advance architectural design of schools so that schools will bring beauty, utility, emotional security, and a more constructive educational experience to our children and to our communities. Let me emphasize again, if I can, what Mr. Caudill mentioned over and over again last night as the basic principle behind his research—"form follows function." The reason I want to re-emphasize that principle is that I think it offers a major clue to the approach we must make in our educational researches in school planning if we are to get the ultimate value from the time and money investments we are making in school building programs.

When Mr. Caudill told us last night that the problem defines the form, he actually presented education and educators with a responsibility they cannot escape, because he did not merely mean the architectural and the structural design problem he might face as an architect in getting space solution, light solution, color solution, heating and ventilating solution, or any other general structural solution. He meant the responsibility of finding a specific solution to those design problems and to the problem of the school plant's contribution toward meeting the needs of growing, developing, and learning children performing in a certain school.

Education needs as much research concerning what goes into stating that problem as far as school planning is concerned as does the architect or engineer. Educational consultants, educators, and graduate students in education who hope to become school administrators and who are studying school plant planning as part of their education have too long confined their studies to structural problems or the statement of structural problems. In my estimation such problems belong in the province of the architect. We have also been

prone to leave to somebody else, generally somebody outside of education, the needed research in education and in those factors of the building problems with which education should be concerned. We have devoted most of our educational research time to the study of what kind of light fixtures, for example, we want to buy for our schools—a problem that the architect is much better able to solve. We have left it to somebody else like the illuminating engineer, the ophthalmologist, or the optometrist to tell us how the growing child sees and performs a learning task and how much of what kind of light distributed in what manner is necessary for that learning child. We write dissertations for our doctorates in education which enumerate the relative physical merits of this kind of heating plant or ventilating system over that kind, again a problem that can be much better solved by the architect or engineer.

While we are doing that, we have been leaving to the heating engineer the job of telling us what kind of thermal surroundings growing children need in order that the thermal surroundings can be an optimum teaching aid in promoting the development, well-being, and learning of those children. We have been evaluating the relative advantages of permanent plastics, for instance, or ceramic surfaces to bring color into our classrooms, or of an emulsion paint as compared with an oil base paint—again something that is the concern of the architect. While we have been doing that, we have actually been leaving to the promotion departments of the paint companies the job of telling us what kind of color effects will do the most good in promoting the learning and well-being of those children.

I could go on and on pointing out where we have left to somebody else—somebody with a limited knowledge of what goes on in the school—the statement of those things that we ought to be stating, while we have been doing a very deluded job in a field in which our architects or engineers are much more competent. We have either accepted unquestionably the standards that those groups have handed us, or we have challenged them, leaving it to the architect to determine what our children need in order to grow, develop, and learn at an optimum rate in school. We have not put into that architect's or engineer's hands any clues as to where the answer to that

problem actually rests. For example, how many of you here could tell why the recommended practices of the American Standards Association, the A.I.A., and the Illuminating Engineering Society on school lighting say 30 footcandles of light is desirable? How many of you here know how much 30 footcandles of light might contribute to optimum achievement? Why do those practices say the contrast ratio or the quality of light within the central field of vision should be inside of 3 to 1? Why is 20 to 1 an adequate contrast in the extreme of the peripheral vision? Why do we accept unchallengingly the statement of the heating and ventilating engineer that at some periods of the year 68 to 72 degrees of effective temperature is the proper temperature of the classroom? What do we know about effective temperature, for that matter? Why do we insist on tables and chairs and say trapezoidal tables are the thing to buy today? I think the time has come when we ought to be able to answer some of those why's ourselves, or to find why somebody else has recommended them to us.

Going back to Mr. Caudill again, I have been intrigued by parallel statements in the philosophies of four different fields concerned with the child in school, because I think in those parallel statements lies the guidance into our much-needed educational research in school planning. For instance, architectural philosophy says "form follows function," but social philosophy, and especially educational philosophy, has been telling us exactly that same thing for over 50 years when they have said that in a democratic society design follows event. We do not have to stop with social philosophy, because biology for at least 75 years has been telling us that function determines structure, or that adaptation actually is the functional alteration of a generalized group of systems into a structure that makes for operational efficiency. Then we come over to our educational psychologists, who have been consistently saying for a good many years that a child learns through activity. Notice those four statements again: in architecture form follows function; in social and educational philosophy, in a democracy, social design follows the event; in biology, function determines structure; in educational psychology, the child learns through activity. They are one and the same statement. If we could actually synthesize the concepts that led to those four different statements I think we would find a single

guiding principle in educational research through which we could arrive at a clear statement of the educational problem to be solved in erecting a school plant.

No matter what we might think of the total concepts from which certain commonly accepted generalizations in education come, we do utilize the basic statements of philosophy. For instance, no matter what we might think of the social philosophy of John Dewey, or even of his educational philosophy, we are building all of the present-day education and educational structures around one concept of that philosophy —that a child learns through doing. That is the concept behind flexible school participation. Whatever we may think of the statements of people in the field of child development—Kassell, Olson, and others—we have moved into the school one basic thing in their concepts and that is the idea that the whole child goes to school. We have moved another concept from that field into our educational planning and educational methodology. When Cannon advanced the theory of hominess spaces he was really giving us scientific proof of the validity of the thing we are doing when we say tension reduction makes for learning. He was showing us that the child as an organism modifies his behavior in a meaningful direction as we lead him into activity to reduce tension, because the human body is always going toward performance, or at least effort, and is always making a constructive modification only as a problem is surmounted in terms of a tension-reducing performance or behavior. Kinesiology has also contributed much. When we design furniture and equipment and insist that it meet certain size patterns or form patterns, we are actually recognizing what the study of body mechanics has contributed to education. Many other examples of the acceptance in our educational planning of the ideas of philosophers, psychologists, physiologists, and others could be mentioned.

If we were going to go back to this matter of the development of standards or of the adequate presentation of our side of the problems so that the architect can make an intelligent solution of his problems, we must go to the real meaning of all these things. We must study them so that we can interpret them in terms of the statement that function determines structure, form of design follows event, function defines form, and so forth.

Now let us look more critically at some of the standards that are imposed on us in the light of those things that I have just been emphasizing. If you would take the I.E.S. recommended practices on school lighting or those statements on school heating that you can derive from the A.S.H.V.E. heating and ventilating guide or comparable codes or from other recommended practices that are handed to you by groups outside of education and if you would make a critical study of them in the light of what the sciences basic to learning have taught you about how the child grows, develops, performs, and learns, you would actually find that most of those standards are derived from the standards of an adult, an experienced or learned person, and not from the needs of an experiencing person, a learning child. Or you would find they were derived from the concepts behind the old passive curriculum that we have been trying to get away from these 50 years or more. They have been validated in most instances by overspecialized authority, the very thing that we condemn in education when we try to build an integrated curriculum or an experience curriculum.

Let me illustrate what I am saying by going over to the field of lighting. On what concept of learning or vision or seeing are based most of our standards of lighting of 30 footcandles incident to the task, or of 3 to 1 contrast in the central field of vision? They are built on the sole concept that the only function of vision is the recognition of symbols.

This concept is derived also from the assumption that, if you can see the detail of the letters or words on the printed page, you automatically get insight into the meaning of those words or letters or forms. To me that does not make educational sense if we are correct when we say that before the child can acquire an adequate use of a symbol he must have the concrete experiences for which that symbol stands. It is around that concept that we are building all of our present-day curriculum, and yet we are allowing lighting standards derived from the older concept to be imposed upon us. On whose authority came the concept behind that lighting concept that the sole function of vision is the recognition of detail?

I am not questioning for one minute the competency of optometrists or their authoritative position in the areas that they have set up for the practice of their profession, so don't

misunderstand me. I am not challenging them in their own business. I am challenging their turning over to us standards for the operation of our business. What is the job of an ophthalmologist? He is a specialist in the medical and the surgical needs of the eye. He works inside the eye or its immediate connections, and he works primarily in terms of the construction of the eye. He is largely concerned with restoring the optical efficiency of that eye, as is also the optometrist. Whenever a science and its derived arts define its area of activity they set up a theory. In ophthalmology, for example, the theory is that the eye operates like a camera and that, as soon as an image is projected on the retina and transmitted by the nervous system back to the visual centers of the brain, sight comes. But the principal concern is with the optical structure of that eye.

The child learns through activity. We are interested in the motor aspects of vision, not the motor aspects of the eye. What activities did light stimulation of the eye illicit in the whole child that we can utilize constructively to direct that child in social insights? It is the conversion of primary experience into synthesis. The question is: What does light do to affect his performance? not What does it do to resolve an image on the retina? The ophthalmologist and the optometrist are not interested in that particular area of activity because their professional concern is with the structural efficacy of the eye. A great amount of literature of research studies in the last few years ought to be synthesized for the better understanding of the child as he performs in school. If primary experience is the foundation for an adequate utilization of synthesis, then we are concerned in a major manner with how we derive primary experience through vision. I am not speculating now, but referring to actual research. We have to take into account, for instance, a study that was made at the Kasell Clinic and published a couple of years ago under the title *Vision—Its Development in Infant and Child,* because that study demonstrated conclusively that we actually learn to see. Seeing in a meaningful way is not automatic insight due to the structural integrity of the eye. Meaningful seeing is learned. We have to take into account also that the definition of concrete things is a three-dimensional function, not a two-dimensional function, as is a book.

McCullough, formerly of the Medical School of the University of Illinois and now of the Physiologic and Electronic Research Laboratory of the Massachusetts Institute of Technology, and his associates were probably the world's authorities in studying the actions of the brain. Their published researches from 1942 to 1948 are very significant to education in this matter of vision and light, because in those researches they showed, as they probed the various areas of the brain with delicate instruments, that no matter what the input from the retina, no matter whether there was good resolution on the retina or not, no matter what that retina was stimulating along the nerve trunks back to the brain, there was no perception, there was no insight, there was no realization that there was a task there until there was a comparable pattern in the motor areas of the brain. In other words, perception was a synthesis of feeling tone and motor activities, not an automatic transfer by some esoteric processes of the image on the retina to insights in the higher centers of the brain. Something must go on inside the child physically as a result of his surroundings in order to produce the insight, the perception, the behavior that we expect to get as a result of the curriculum that we set up for him.

As long as we confine our definitions of lighting standards to the standards imposed on us by the vision specialists and the illuminating engineer today, we are lighting for the passive school of yesterday and we are defeating the purposes of the curriculum of today.

Let us look at color. Who is going to tell us what colors we should have, the originators of color dynamics and color conditioning or those who study the effect that color and color temperature have on the successful performances of the learning child? About three years ago a very elaborate study was completed in the Institute of Ophthalmology in the University of London under the direction of a man by the name of Finchion. This study showed that the triggering mechanism of proper accommodation was actually a product of the color in the surroundings. It showed that color was efficient, that it led to constructive activity, that it reduced tension, and that it achieved the goals that we are driving at in education only so long as the spectral characteristics of that color contained representations of all the wave lengths. This research also

showed that, in a critical seeing area like the classroom, we cannot use deep colors or pure colors because they produce a false triggering action.

At the Wilmar Institute of Ophthalmology at John Hopkins University in 1928, a pair of investigators, Peree and Rand, who laid the foundation for most of our present-day investigation in wave length as it affects vision, showed conclusively that there are two kinds of acuity in vision—a momentary acuity, used in making an instantaneous response, and a sustained acuity, used for a problem-solving task where time is involved. Their research demonstrated that those two kinds of acuity were dependent upon the light peaking at two different values. What I am trying to say is that the color summation of the light as far as all the wave lengths are concerned should have the peak at one value if we want momentary acuity and at another value if we want a sustained acuity in a problem-solving situation, and the two can not be reconciled.

I could go on and on showing you that there are many indications in research that the standards by which we permit our designs to be made just do not make sense in keeping with the curriculum that we put into those structures. In the area of heating, for example, what do we mean when we say 68 to 72 degrees is the proper range for the temperature of a room at a certain time of the year? That standard was based on meeting the needs of a resting adult. Actually, a child needs a lower effective temperature, a significantly lower effective temperature, than the adult needs. One of my pet statements is that we should take the control of the classroom temperature out of the hands of the teacher, who determines it by her own subjective evaluation and needs, and let the child have a temperature that makes it possible for him to grow, develop, perform, and learn.

We have been led to believe by engineering standards that if we maintain a temperature of a certain range the child will be comfortable and will then achieve. We have also been led a little further to see that they have not been talking about dry bulb temperature—they have been talking about the variables of effective temperature. So we are told that if we cannot lower the humidity by taking the excess moisture out of the air, we can increase the speed of the fan and increase

the comfort of those in the room. We are also told that, if the child is losing more heat than he is gaining, we can put radiant energy into the room by solarization or some other means and replace that body heat.

Let us take a look at that concept. The body has two types of body heat control mechanism. One of them is the mechanism located in the brain stem that keeps our operation within a certain range if the environment is adequate. The other one makes adjustments in that internal mechanism if the environment presents any hazards. We have an emergency mechanism and an operating mechanism when there is no emergency. The emergency mechanism is so built that merely the stimulus of a little area of the skin will produce a response all over. Let me show you how it works. Suppose a room feels too hot or has too high an effective temperature due to the presence of excessive humidity and heat. The nomograph of the engineer says that we can get effective temperature at a particular humidity and a particular heat level by increasing the air movement. Certain other researchers have said, "Turn that air movement right on the child, rather than let it go over his head." If we in education do not know what it is all about, we accept that as true. Actually, the physiologic mechanisms of the skin make us respond in a very peculiar manner because, when that air movement gets up to a level that permeates tactful threshold, we can feel it. Even though it is only on our face or our hands, it reverses the body thermal mechanisms that are unloading heat because it says, "Look, there is an emergency. It is getting cold. Shut down your surplus circulation so you won't lose body heat." It lies to us, that is right, but that is the way is works. Therefore the result of increasing air movement above a certain speed is to defeat the very purpose of introducing that air movement.

I could go on and point out that in acoustics the acoustical engineer solves the problem by the elimination of certain sounds. However, when he reaches a level where he deadens a room, he actually is promoting unconsciousness in those children, because we must have a certain amount of stimulation in order to make us ready to perform. When we eliminate the extemporaneous sounds we build a very nice room in which to sleep, but a poor room in which to perform. We

have too much inertia to overcome to reach a state of readiness to solve the problems.

I could go on and on with this discussion in many areas. What I am trying to say is that we have to define the standards of activity. There is a vast amount of literature to be correlated. We have to construct theories and models. I am talking in the sense of total behavior in order to provide the physical specifications for stating the educational problem to the architect. School planning, like the education of which it is a part, is an art. But any art is only as good as the sciences from which that art is derived, and those sciences are only as sound as the research on which their theories have been substantiated. We in education, with the tremendous investment for which we are responsible in school planning, can no longer depend upon the researches of others who have a narrow specialization, a narrow interest in this business of child performance. We have to do the research, beginning with the philosophies that have entered into methodology, so that we can give the architect such a clear, complete statement of the problem—education—that he can make an equally clear statement of his structural problem and come up with a solution derived from his research, knowledges, and skills.

SCHOOL HEATING WITH WARM AIR

by

Lorin G. Miller

Comfort

It is our intention to proceed on the assumption that the student's interest in school and the progress he makes scholastically varies with some function of his comfort. It is therefore of importance at the outset to get a quick look at some studied subjects and the condition of these subjects and the surroundings during a period when they testify to a condition of comfort.

The following statements average the data taken by various laboratories while making comfort studies, with the subjects seated at rest. Since the values quoted are averages, not direct quotations, we are taking the liberty of presenting them without the customary reference. In my opinion they present a very clear case.

Room temperatures	*Degrees F*
Mean wall temperature	72.0
Ceiling temperature	73.5
Floor temperature	71.1
Air temperature—2′-6″ height	70.6
Air temperature—5′-6″ height	72.5
Air temperature—10′-0″ height	73.3

Temperatures of subject	*Degrees F*
Outside shoe surface	73.9
Lower skin surface of toes	84.6
Skin surface—calf	91.1
Skin surface—thigh	92.5
Skin surface—hand and fingers	93.1
Skin surface—trunk	95.0
Skin surface—cheek	95.8

Temperature differences	*Degrees F*
Air—floor to ceiling, 10 ft.	2.7
Surface—floor to ceiling, 10 ft.	2.4
Skin surface—foot to cheek, 4 ft.	11.2
Shoe surface to cheek, 4 ft.	21.9

The human body is in itself a heat rejecting mass whose internal conditions are isothermal. In health and at rest, the average individual must reject about 400 British thermal units per hour to maintain this inward state of constant temperature at 98.6°F. Of this heat 300 B.t.u. per hour will be sensible heat and 100 B.t.u. per hour latent or evaporation. Of this 400 B.t.u. per hour, the hands and lower legs dissipate 120 B.t.u. per hour, or 30 per cent from about 12 per cent of the surface area, during the time when maximum or satisfactory comfort is experienced.

At the risk of appearing academic, a review of the ways the body may lose its superfluous heat is presented. The latent heat usually disposes of about one fourth the requirement by evaporation. Since it uses about 1,000 B.t.u. in evaporating a pound of water, one tenth of a pound per hour evaporated from the surface will dispose of 100 B.t.u. Under conditions where the atmosphere is saturated, at body surface temperature no evaporation is possible, and the heat must be dissipated by other means. In general, the humidity or vapor content of the ambient space is one measure of comfort, since the body constantly rejects moisture.

Convection, or passage of air over the body surface, is an effective and, if properly controlled, a pleasant means of disposing of the body heat. Body heat raises the temperature of the air in immediate contact, and evaporation adds moisture to this same layer, and both additions decrease its density. A natural convection upward will result, which will under favorable conditions carry away the heat, moisture, and odor with a fair degree of satisfaction. In a general way, it leaves the body immersed and blanketed in a layer of too-warm, too-humid, odor-filled air. The fact that we are accustomed to it does not make it more attractive. The answer, of course, is to apply to the air some motive power which will move it past the occupants at a proper rate, volume, and condition to provide the desired effect.

There are many by-products to this feature of forced convection. It will allow air to be washed, cleaned, humidified, de-humidified, heated, cooled, de-ordorized, or sterilized, as occasions demand. The remaining method of disposing of body heat is that of radiation. In this process, heat in the form of radiant energy passes from one body to another. The

net result is a loss from the higher temperature body, and, of course, a gain by the cooler body. Since the human body is a heat-rejecting mass, it is unreasonable to admit to living space surface that is at a higher temperature than body or clothing surface. To do so will add to the body's heat and complicate the problem of disposal. Since face and upper body temperature reach 95°F in comfort, this seems to be a reasonably high limit for ceiling or wall panel temperature. Shoe and clothing temperature of lower extremities, which reach about 75°F, should limit floor or baseboard panel to something near the temperature.

Orientation of room surface temperature is important. With a cold window on one side or in one range and a hot panel or radiation in another, the familiar hot-cold contrast is experienced. The surface temperature ratio of outside wall to inside wall should be held to a low figure. Wall treatment with insulation, and window protection with double glass will do much. Some means of adding heat to cold wall surface is often used.

Comfort, therefore, may be attained for the occupants of a room where the surface temperatures do not vary widely nor deviate too much from 75°F at the floor to 95°F at the ceiling. In the provision of comfort condition, air that is tempered to the correct temperature and humidity and made free from odors and bacteria is circulated past the occupants at such a rate that discarded heat and vapors are carried away from all parts of the body at the natural rate.

COMPONENTS

Every heating system must of course have a fuel burning heat exchanger for the purpose of accomplishing the transfer of heat from the combustion chamber to the medium used to carry the heat to the conditioned space. With steam or hot water, these units are called "boilers" and rated in square feet of Equivalent Direct Radiation. One square foot of EDR equals 240 B.t.u. per hour. When air is used to carry heat, the unit is usually designated as the "furnace" and is rated in B.t.u. per hour bonnet capacity. The *Guide* of the American Society of Heating and Ventilating Engineers states that the heat transfer in boilers will average about 4,000 B.t.u. per

hour per square foot when operating at design load. The rate in furnaces is given as up to 4,500 B.t.u. per hour per square foot, without unduly high metal temperatures. Boilers are required to be water and steam tight and somewhat pressure resistant, while furnaces must be gas tight against very low pressures. Both units use either steel or cast iron heating surfaces.

Every system is designed for a certain motive head required by the structure to move the heat from heater to rooms. In small schools, gravity may be used, but such a system is slow to act and difficult to control. In steam plants, a system of traps is used to separate the steam from the condensate and allow the steam pressure to overcome the pipe resistance. In hot water plants, a pump or pumps furnish the motive power. In warm air plants, a fan or fans supply the pressure to distribute warmed air to the rooms, return the cooler air, and bring in air for ventilation.

Taking into account the motive head available for distribution, the designer of any type of heating plant must carefully design and size a system of pipes or ducts suitable for accurate distribution and must connect them to properly located and sized radiators, convectors, or registers. Such a system must include valves or dampers to permit the balance of the system and ready response to changes in conditions or demand.

CONTROLS

Heating systems are designed to care for maximum conditions. In this region, specifications would require that the building be kept at 70°F while the outdoor temperature was constantly at 5°F below zero. Some requirements might add some capacity to account for pick-up or intermittent operation. The heat loss calculations can be made to correspond very closely to the actual loss when these conditions are imposed. The difficulty is that only a very few such hours occur. The remainder of the time some rooms tend to overheat due to occupancy, sun, or residual heat. It is obvious that each room should have its heat supply controlled by a thermostat, since conditions cannot be controlled. A poor substitute is a type of zone control which may partially regulate conditions by direction, taking care of sun and wind direction and velocity.

It is not enough that the controls are able to adjust the supply of heat to meet any condition—they must do so in a very short period and over a great range. As an example, during a period of nonoccupancy, the thermostat has called for heat and has satisfied the conditions. The bell rings; in come 30 or so youngsters from play or other activity. To make matters worse the sun comes out. The heat loss of such a room might be 50,000 B.t.u. per hour on a -5°F day, but today it is 30° above, which cuts the loss in half. The youngsters will provide 12,000 B.t.u. and the sun easily another 10,000. The room will require very little added heat. If the plant is one using any type of panel heat, it will have heated literally tons of building material to 120°F or more. The residual heat is large. If it uses any type of water or steam for conveyance, these pipes and heating surfaces will also add to the already overheated space. To be more specific, one cubic foot of concrete cooling 1°F will raise the temperature of 1,500 cubic feet of air 1°F. Similarly, 1 cubic foot of water will raise 2,500 cubic feet of air and 1 cubic foot of steel will raise 3,300 cubic feet of air. It is easy to see how such residual heat might raise the room air temperature to great discomfort under some such conditions. It is easy to visualize conditions where heat would need to be removed during a part of the day, even in heating season.

The law may require, and in many states does, that a certain prescribed volume per pupil or per unit of building volume or a prescribed percentage of air be brought in from the outside. Such laws also may require that a specified volume of air be circulated at all occupied periods. Such regulations are proper and are growing in number.

The following general outline of design of a warm-air heating and ventilating plant for a school will illustrate what can be accomplished. For better control and greater efficiency, the load should be divided between at least two units or furnaces and, in the case of large loads, in three units. In mild weather, one unit can carry the load, for the greater portion of the season only two would be required, and only in severe weather would all of them come into use. Unless the space or economics dictate otherwise, one blower will suffice and should be used for any battery of furnaces.

In order to control conditions properly in the occupied space, it is necessary to have two supply ducts. Each duct will carry the proper, or predetermined, mixture of outside and recirculated air. The high temperature air will pass over the heating surface and make heat available as long as some thermostat is calling for heat. The low temperature air will either be furnished by a separate fan or by-passed around the heating surface. The two ducts will furnish air to the room through a thermostatically controlled mixing damper which controls the temperature of the air admitted. The quantity of air circulated and the proportion of "fresh" to recirculated air will remain constant.

The location of the points of admission of the air is important. Here again state or local ordinances may limit the choice. It is best to inject the air along the outside or "cold" wall from a position in the floor or as near the floor as codes and building construction will allow. The stream of warm air should be so directed that it does not strike an occupant or a solid surface with any noticeable velocity.

The stream or streams should be located or spread so that the cold wall is pretty thoroughly blanketed by the stream. This type of coverage will raise the temperature of the cold wall, mix the infiltration air with the warm, and provide a uniform flow of air across the occupants.

The quantity of air supplied to each room is also the subject of some ordinances. Usually, in the interest of economy, the amount of air specified or designated is inadequate. The average requirement is about 30 cubic feet per minute per occupant, of which 25 to 30 per cent is to be brought in from outside. Sometimes the air volume is specified as a definite or minimum number of air changes or room volumes per hour. Neither of these methods will satisfactorily provide a proper velocity over the occupants to insure comfort conditions.

To illustrate: When six room volumes are circulated per hour in a room where the air is all brought in from one side which we will call the width, the average velocity in feet per minute would be 1/10 the room length. A room 30 feet long would therefore have an average velocity of 3 feet per minute and one 50 feet long would have one of 5 feet per minute, certainly less than a "breeze" or a "draft." Twenty-five to 35 feet per minute are the lowest perceptible (and probably

measurable) velocities. Such velocities would only be attainable in the average classroom by recirculations of 30 to 60 per hour, which by present standards are not available. By the same yardstick, however, it would seem that 10 to 15 recirculations might be reasonable.

The location of the exhaust grilles is not so critical. The velocity of the entering air stream decreases with the square of the distance from the grille face. It is not likely that occupants will be located close enough to be annoyed by this air movement. It is good policy to keep the face velocity low and to have the openings high on the inside walls. This will exhaust the warmer moisture and odor-laden strata and remove the tendency for any cold heavy fractions to drift along the floor and be noticeable.

With concrete slab floors directly on the fill, care should be taken to insure warm floors. A duct of tile or concrete carrying the heated air and traversing the cold perimeter of the building will keep the floors in that area sufficiently warm. In this construction, the leaders from the plenum to the perimeter duct also supply the small amount of heat required to keep the center portion of the room at a comfortable temperature.

When air, warmed or cooled, is used to provide comfort conditions as the heat carrying medium, it may provide some or all of these advantages. Since all the air passes a central station, it can be filtered, washed, humidified, dehumidified, deodorized, or otherwise cleaned, providing conditions not possible with other systems. Filters may take a number of forms, depending upon the nature of the containments, the degree of cleanliness desired, and the finance available. Washing, humidifying, or, in some cases, dehumidifying can be handled at the central point where all the air can be passed through the sprays. In a like manner, a bank of activated charcoal filters or equivalent can be employed to eliminate odors and other refuse. Eliminating water and steam piping from the system will obviously remove the difficulties incident to them, such as leaks, freeze-ups, corrosion due to water impurities, danger of low water conditions in the boiler, and the like. Since the heat is applied directly from the combustion surface, it is clear that a second set of heat-transfer surfaces in the form of radiators, convectors, or other coils are

unnecessary. This has its advantage in saving in space, building construction, and cost.

The economics of the heating plant is in the hands of the designer of the building and the plant. In general, the cost of installation of a warm-air plant is lower than that of any other type except possibly electrical panel. Compared with a split system, where convectors are used for heating and ventilation is separate, the cost is often about one half as much. The efficiency, while somewhat affected by design and installation, is largely in the hands of the operator. Proper draft control, burner adjustment, and surface cleaning schedule mean very much to the fuel economy. Here the warm-air furnace presents some advantage, since it has only one side of the heating surface with any tendency to be insulated with a deposit. No blow-down or water-hardness deposit affects its operation. In general, there is less draft loss through the unit, thus it is more independent of draft conditions.

There is, in general, no great difference in the life of the equipment. If all records were available they would probably show that some cast-iron boilers have had exceptionally long life, and the same records would show some of these boilers with exceptionally short life due to bad handling or accident. It is the general opinion that obsolescence and change in requirements affect the equipment life more than actual use. A careful analysis gives warm-air heating a very high rating in comfort economy and ease of operation.

WARM AIR HEATING

Discussion

Discussion leaders: George Caleb Wright, Robert Bulleit, Lloyd Fitzpatrick, and Hans Mohn

MR. FITZPATRICK: Our speaker this morning brought out many points that should be of interest to this group. We have men around the table here who are authorities on quite a few of these subjects and who will be glad to entertain any questions that anybody in the audience may have. I might start the discussion with a question, How much authority should be given to the architect in making selections of the materials when we realize that of all the different types of materials in each field there must be some which are better than others? Would anyone like to comment on this question?

MR. MOHN: I believe that the architect should have full authority, although he should consult with the teachers, principals, trustees, and school boards and also with the authorities from both Purdue and Indiana universities. He should have full authority to go ahead and decide after he has consulted everybody.

MR. FITZPATRICK: Dr. Harmon, would you like to comment on that?

DR. HARMON: I think I can answer that by asking the question, When you are sick and you employ a physician, do you say, "I'm employing you only so long as you prescribe so and so," or do you put the responsibility and authority in his hands? In other words, you use good judgment in selecting him; you have let him know your economic limitations; you have described your symptoms—from that time on the authority and responsibility rests on him. I think that is a sound analogy of how much authority we should give the architect.

DEAN MILLER: I would say by all means let your architect do what you want him to do. I think he is informed on it. I am an engineer defending an architect, which is rather an unusual thing, but I think he is just as much a specialist as anyone else. If you have confidence in your architect, give him the job and he will give you some good buildings.

MR. FITZPATRICK: Along that line, however, boards do seem to want to know what they are about. I think they wish to place all authority with the architect, but they still like to know. In our community there has been no school building since 1927, and our board seems to want to know what is new in the way of school buildings. Each board member is quite busy, but he has taken time away from his work to visit several areas in this state in which there are new school buildings, particularly new high school buildings. I am wondering whether some of the universities or state departments could have a laboratory where board members could go and see all of these materials on acoustics, school lighting, and so forth —one spot where they could go and become informed. Is that on the way or not? Am I behind the times in not knowing about it?

MR. MOHN: I took over about six years ago as a trustee in a community that has almost doubled itself in population in the last six years. I built a million-dollar high school. Since my experience in building a school was nil, I consulted with various civic-minded people in the community, school principals, school officials of the city of South Bend, and others, and we arrived at what we needed. In selecting an architect I was determined to have a man who would really dream about a school building. A good architect has to be a dreamer. We picked a man who had never built a school building before but he had built some ultramodern buildings, and this man came up with a wonderful school building. It has been in operation one year and there are only a few minor changes that I would make in that building today.

MR. WRIGHT: I want to underline what has just been said. I think there is altogether too much emphasis placed on specialists. We heard that word used yesterday quite extensively. I feel that your best school, your best approach, is to select a good architect—and I underline that word "good" for emphasis. The finest work of architecture that I know about is that which has been done by a good architect confronted with an absolutely new problem, because it is a challenge to him. A good architect is going to find out all about that problem before he proceeds. I think we place altogether too much emphasis on the number of schools the architect has

built. When you do this you lose sight of how good he is as an architect, and that's the important thing. That's where you are going to get results.

MR. WESTOVER (in audience): Unfortunately we are confronted with an emergency. We have to build buildings now, and we can take only the background of information that is available to us at the moment. We wish we had more information. One of the problems in the matter of heating is that, so long as the windows or radiators can be adjusted by the teacher, you have that human element entering into the picture, an element which is rather difficult to control. We all hesitate about a system that is 100 per cent automatic. I don't think we can nail windows tight shut, much as we might like to. First, is it essential to have six air changes per hour, or is it a generally accepted standard that has not in recent years been subjected to critical, unbiased laboratory investigation? Then I would like to know where this standard came from in the first place. I question whether it has a background leading to the matter of efficiency. Can a zone temperature control for rooms be designed as satisfactorily as individual room control? We require the individual room control in Indiana. Are we making you people spend too much money in the matter of control? That one Dr. Miller can answer for us. Then, is it not possible that a part of our problem is the matter of humidity control? I noted in the last issue of one of our magazines that relative humidity of 50 per cent will kill bacteria spread by coughing and sneezing. This appeals to me as being an interesting approach to the problem.

MR. MILLER: I don't have the slightest idea where the standard of six air changes an hour came from. If you are using a warm air system, I think it is inadequate. If you are using another system and you want natural convection to take care of it, it isn't necessary. I say it is inadequate, and I don't believe it should be applied to both gymnasiums and small schools. If there is an answer to it, Bill Miller will come up with it.

Next, are we spending too much on control? Well, I can't answer that question because I don't know how much we are spending. I wish we had one thermostat that the teachers could fool with and another one that really did the job. In respect to the matter of humidity, if anyone calls me on the

telephone and asks me what percentage of relative humidity they should carry, I tell them enough to keep the furniture from falling apart. I believe information concerning humidity should be given by the medical profession or the physiologists. I don't know what the answer is; I should say somewhere in the neighborhood of 35 per cent, however. I don't know whether 50 per cent humidity will kill germs. I have a feeling, and it is just a feeling, that germs will thrive in that kind of an atmosphere.

DR. HARMON: May I break into that humidity problem? I happen to have worked on the original research in connection with determining that humidity. The investigation was for the purpose of finding out what could be done to control air-borne infection. The first problem was to determine what percentage of all infection picked up in the school is due to air-borne infection. It was found that about a third of the infection is air-borne infection and can be controlled by some type of air control.

The investigation tried three methods. One of them was ultraviolet radiation. In a perfect system, you could control or kill that third of the organisms with ultraviolet radiation but you will also kill protoplasm and thus you will harm the individuals in the room. Therefore, you are going to have to take some of the advantages of the system away by shielding the system.

The next method tried was chemical sterilization or glyco dispersion. The investigation showed that, adequately handled, glyco dispersion will kill the same organisms as will ultraviolet radiation, but dispersion has to be maintained at a very critical level. Again, it is beyond the chemical possibilities to do it.

The third procedure was to study humidity, because the air-borne organisms that are significant are carried in a droplet of a certain size, and a droplet of a certain size will take those organisms out of the atmosphere and inhibit or drown them. Your ventilation and your heat should be as near foolproof as possible. The schools that teach the teachers should have in their curriculum something about how to handle ventilation and heat control in their rooms.

MR. FITZPATRICK: The question is about how to select the architect. Are there any of you men who would like to

comment on that? We have a well-known architect right here at our table.

MR. WRIGHT: Well, that is not too difficult to answer. How do you select a doctor or a lawyer or any of your other professional advisers? You find out something about the work he has done, you find out what his clients think of him, you find out how sound he is financially, and then primarily it is a matter of personalities, since the relationship between an owner and the architect is a very intimate one. You and the architect are going to have to work out a long and difficult problem together. He has to be someone you can work with, and you must meet him to know that.

MR. SEAGERS: Dr. Wilfred Clapp is here from Michigan. He is chairman of the joint committee that prepared a questionnaire for the National Council and A. I. A. Probably, Mr. Wright, he should have had you on that committee so that you could have included those questions on their questionnaire.

MR. WRIGHT: I would have loved to. In selecting an architect, it isn't just selecting an architect. Go into his office and see who is working for him, what type of personalities he has around him. That, to me, is one of the most important factors in hiring an architect.

MR. FITZPATRICK: According to my thinking, the architect needs some help regarding the setting up of standards. As I first brought out, there are always two or three or more ways to do a thing. The average board member, I believe, wants to do the things right, having that in mind more than the matter of costs, and he wants to know the best methods of heating and the most recent theories on standards of lighting. I believe that most of the people in this group—that is, school board members—would like to have a little more definite guide as to what the final selection should be.

MR. WRIGHT: I think the chapter of the Institute would welcome the opportunity to give that sort of information. It would of course be difficult for architects to tell about architects, although it can be done. Dr. Harmon has just handed me a note asking about this matter of specialists. The hazard in specialization is that of standardization, and I don't know of anything more deadening than standardization. A specialist is so inclined to repeat a certain size room, a certain

design of the floor base, and so forth, that he just does not always think his problem through. That's what a good architect ought to do. I think a great deal depends upon the architect's training.

I am a dreamer, and I think the dreamer is necessary, but he should have employed in his organization men who know the various complicated parts of the building. For instance, in a good architect's organization, a structural engineer, a mechanical engineer, and an electrical engineer are very necessary along with the dreamer to get a real job done. We are not specialists in your field—we can't be educators; we can't be factory men. We are architects, and we are trained to help you house your problems. Your problems should be clearly and distinctly laid before us. I think you should stay in your educational field and we should stay in our field, and in the end you will have a good building.

MR. MOHN: Since we are deviating from the heating and ventilating problem, I am wondering if I might say that I don't care what type of architecture you use in a new school building. While I am not trying to promote the older type of architecture, a building which has stood for 50 or 60 years has some beauty in it that to me these present-day schools do not have. I am wondering whether in 25 or 50 years these new buildings are going to look like chicken houses or lean-tos.

MR. WESTOVER (from audience): May I say a little something? I am not defending architecture; however, if you look back through the past 30 years, you see that materials and prices were very different from those of today. You hold the architect responsible for the operation, for the maintenance, for the appearance, and for the cost—and probably the biggest problem you have is the cost. He has to weigh many of these things in his planning and he gives you a different appearing building. You are getting away from the schoolhouse type of building. You are expecting different types of functioning now, and many other things are entering into your problem. I believe your architect is probably giving you the best results obtainable. That is what we saw last night when Mr. Caudill's pictures were put on the screen. We saw something entirely different from what we have had—something new in the approach, something new in the curriculum, something new in the functioning and in the cost.

I think we have one question that your moderator has brought out that still has not been answered. We have some things that school boards have to contend with, and we have things that trustees have to contend with. They often come into my office and say they want a building code to see how to build a building. Well, they can't take that building code and find out how to build a building. You have to study that code for years to learn to apply it to a building and to know how to build a building by it, how to get a good heating and ventilating system and a good lighting system, and all of those things. You have to live with it a while to see how it functions and to see how it is interpreted. The fellow who has been living with it and working with it can give you the answer, and I have a lot of confidence in the good architect giving you that answer.

THE HIGH SCHOOL OF THE FUTURE

by

G. Robert Koopman

Recently a serious group of people met to consider the theoretical base for planning the American community. The group was composed of a selected panel of people representing various disciplines and applied fields as well as of individuals having quite different experiential backgrounds. Amazingly enough, they came to a unanimous agreement on the theoretical base, which was in itself a thrilling experience. However, when the writer met with a continuation group which scheduled itself to discuss the theoretical base for the secondary school program and plant planning, agreement was harder to reach.

While some general agreement was discovered within the educational profession for the program of the American community school, it was soon ascertained that the bases for the program had not been translated into any usable, theoretical base for secondary school plant design. Yet it is this problem that is baffling us. This paper represents an attempt to take one little and fearful forward step into the area of secondary school plant design. Because the problem of plant design is so tremendously vast and varied, and because the solution of the problem depends primarily upon an acceptable concept of the program, I shall limit myself to developing some assumptive principles of design based upon a restatement of the program and purpose of the American secondary school.

During the next 10 years it is reasonable to assume that American secondary schools will be built, added to, and remodeled in vast numbers. Large building programs are indicated in three particular areas: (a) in the southeastern part of the United States, where holding power will be greatly increased and where either equal or unsegregated secondary schools will be built to care for the needs of the negro population; (b) in the urban industrial centers, large and small, which are the receptors of the new population and of the transferring population which constantly moves from the agricultural areas into the manufacturing centers; and (c) in the essentially rural areas which will greatly increase their

holding power and will probably hold their own in absolute numbers of population while exporting population to the urban centers. Also, in some undeveloped areas of the Pacific Northwest an increase in population will probably occur.

What kinds of buildings shall we build during this building boom? The present policy of designing buildings based on the thinking of the past and the present must be discarded. The latest secondary schools to open their doors in this country represent distressing economic and educational waste. Every one of them has, so far, been educationally obsolete when opened. This sweeping statement is made as a way of assessing the state we are in rather than of implying blame. Certainly no one of the constituent groups involved in school plant planning is to blame except in the sense that we are all to blame for not putting our best thinking together to come to some general agreements on design. We need to provide the time and resources to do three things, namely: (a) to assess critically our successful experiences in plant planning and construction through research, (b) to reach some broad agreements in regard to secondary school plant design, and (c) to bring into a continuous working-planning relationship the various disciplines and interests involved in secondary school plant planning, construction, and evaluation.

With these introductory remarks, let us turn to the substantial issues in the field of secondary school plant planning: (1) Where do we stand in regard to the organization of the community school? (2) Where do we stand in regard to the forward planning of the secondary school curriculum? (3) What program requirements must the secondary school plant provide for? (4) What next?

WHERE DO WE STAND IN REGARD TO THE ORGANIZATION OF THE COMMUNITY SCHOOL?

The American Association of School Administrators in its Twenty-Sixth Yearbook dealt with the expanding role of education.[1] While this document is certainly uninspired, it

[1] American Association of School Administrators, *The Expanding Role of Education*, Twenty-Sixth Yearbook of the American Association of School Administrators, Washington, D.C., 1948.

represents a fair consensus of the educational profession in regard to expansion of the educational program. Written in 1947 (published in 1948), it is a measure of the impact of World War II upon the educators' imagination. It is still far ahead of actual practice and accomplishment. Anyone accepting the assumptions in this book, particularly Chapters III to VII inclusive, must realize that the secondary school must be considered as an integral part of the community school rather than as that citadel of reaction and academic drill which was the pride and joy of secondary school men and women only a few years ago.

The variations in the organization of community schools should be infinite, or as numerous as there are community schools. At the same time some assumptions should be made about forward planning. The writer attempted to put a floor under the secondary school by defining the neighborhood school as a school caring for levels N-K-10 and for such adult education as should be decentralized by neighborhoods.[2] This proposal, while radical in its implication, does represent a logical extension of the two volumes of the Educational Policies Commission which define the program of the American community school.[3]

This solution would get us out of the difficulty in which we find ourselves when we use the terms "elementary school" and "junior high school." These terms are essentially outdated, although the term "elementary school" is imbedded in the English language. In regard to the junior high school, it is fair to say that we have gone all the way around the clock in a period of three or four decades. For forward-planning purposes the concept and the term are essentially obsolete, and the quicker forgotten the better. I say that, even though I helped pioneer the movement and realize the great benefits it has brought to American education.

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[2] Koopman, G. Robert, "The Special Significance of the General Education Movement in 1948," *School and Society* 68:106-108, August 14, 1948.

[3] Educational Policies Commission, *Education for All American Youth*, The Commission, 1944; also *Education for All American Children*, The Commission, Washington, D. C., 1948.

To accept the neighborhood school concept would be like cutting the Gordian knot. Many confusions in the area of curriculum, teacher preparation, teacher certification, and administration would disappear.

On this elevated floor or base, a "peoples college" to serve the larger community could be erected. This could be a tremendous institution even in a rather small service area. It could become the symbol of cultural improvement dealing with problems ranging from the establishment of a symphony orchestra to the upgrading of the livestock on the farms. This institution would make more educational dreams come true for the American people than any other single move.

These new upper schools, secondary schools, peoples colleges, or community colleges are already becoming schools of general service, but higher education still places its heavy hand upon this budding institution and in many cases we find two-year extensions of the community school program still called junior colleges, and still justifying themselves in the pinches by trotting out a few students who have done well in foreign language and mathematics. Citizenship and the improvement of the culture are objectives that are usually included, however, and it is on these objectives that forward planning should focus attention. Because of the history of the situation, formal secondary education, vocational education, recreation, adult education, and that part of the total program which provides transferable college credits tend to be organized and administered separately in most communities. These tendencies cause bad public relations and confuse people as to the purposes of education. Those trying to improve education through forward planning should do everything possible to pull out the partitions that separate these parts of the community school program. The recognition of the possibility of a simplified community school organization based on two major elements, the neighborhood school and the community college, instead of on many divisions does not imply that in any given community this kind of an organization should be sought for directly. The desirability of variation has been previously referred to and should always be recognized. However, the blind should not lead the blind and the vision should always be made manifest.

WHERE DO WE STAND IN REGARD TO THE FORWARD PLANNING OF THE SECONDARY SCHOOL CURRICULUM?

During the last few decades the American secondary school curriculum has expanded admirably. In fact the comprehensive American secondary school is one of the world's leaders in education. While still adhering to many concepts and objectives associated with the dead past, it has by accretion taken on new functions and program elements. While denying that it is a school for citizenship, it has through its amorphous extracurricular activities done much for citizenship. It devotes far more time to the study of social phenomena than does any other secondary school in the world. It has attempted from time to time to serve as a youth center for the community. In most cases it is the center for adult education which is cared for by organizing a school within a school rather than by integration. In many cases it has become a center for geriatrics, and gerontologists are becoming more and more conscious of the services to the aged that community adult education may perform. Unfortunately, in the "wish images" that are carried around in the minds of most citizens, the secondary school is still, first of all, a place where a youth ought to be incarcerated and where he should have his mind sharpened, through the processes of Prussian discipline (one of the world's greatest failures), by being drilled in certain unspecified and unappetizing disciplines. In other words, in spite of all the excellent developments in secondary education, we are now at the height of the confusion as to the purposes of the so-called secondary school and the program parts.

The resistance to taking on new functions is slight, and the dynamics of taking on new program elements is clear. Each new element comes in through a carefully organized pressure group which interprets some real need of society. This business of taking on every function and activity should, however, be subjected to some criticism. Or better yet, governing authorities should restudy the problems of policy and function and should draw lines where lines should be drawn, always deferring respectively to new needs, since the upper school must be thought of as a direct need-meeting agency as well as one which has certain functions to which it must

always give priority.[4] The induction of youth into society is a priority function.

On one matter educational leaders must be adamant, and that is on the preparatory concept. All of the research we have tends to advise us that we should cease thinking that any part of education should be evaluated in terms of the preparation that it gives to some later subject matter or later life stage. This is the process that has caused us to waste so much time on education that is not real at a given time to a given learner. This is the concept that often has made education a threat to the mental hygiene of the learner. Rather, we should select and evaluate all educational activities in the light of the immediate contribution that is to be made to the learner. Thus are his future needs best served, and thus education may become a real, efficient, challenging, satisfying and pleasing experience for him even though the tasks accomplished may be difficult ones.

The prime objective of the entire community school program should be citizenship education in its broadest sense—in the sense in which it is defined in the Twenty-Second Yearbook of the National Council for the Social Studies.[5] We in the United States of America are going to survive or perish according to the quality of our citizenship. Citizenship education thus becomes a prime requisite in a free and expanding culture such as ours. More than that, it is one business that will not be cared for by any agency other than the public school. True, other agencies can and do contribute to citizenship education. Private schools are in this sense parallel to public schools. In most states this principle is defined in the statutes. But the public school, implementing as it does compulsory education, is the appointed guardian of American citizenship. It can only execute its trust by accenting citizenship education in its culture. Some people have put up the straw man of the incompatibility of citizenship education and academic education. This is pure nonsense. True, certain nation-states, when in the hands of totalitarian regimes, have

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[4] Stratemeyer, Florence B., and others, *Guides to a Curriculum for Modern Living*, Bureau of Publications, Teachers College, Columbia University, New York, 1952.

[5] National Council for the Social Studies, *Education for Democratic Citizenship*, Twenty-Second Yearbook of the National Council for the Social Studies, Washington, D. C., 1951.

introduced a propagandistic type of citizenship education. This can never happen to us unless we do go totalitarian.

The modern definition of citizenship education as expressed in the recent Yearbook of the National Council for the Social Studies (*op. cit.*) makes it clear that citizenship education or an emphasis upon the goal of citizenship is completely desirable either from the point of view of mental health or from the point of view of a person interested in academic achievement.[6] Citizenship education makes all knowledge of more worth, for what shall it profit a man if he learns to make an atom bomb and has not the morality or the citizenship to treat his knowledge constructively? The wholesome personality as we want it will combine knowledge, morality, and civic responsibility. Individual development and social development properly defined are one, not two—are unitary, not two incompatible elements.[7]

The results of the research and deliberate thinking of the American Youth Commission and of the Educational Policies Commission is summed up rather well in terms of certain imperative needs of youth and society in a publication of the National Association of Secondary-School Principals.[8] The list of needs is a very helpful guide to curriculum planning.

So much background about organization and curriculum seems necessary before anything can be said about secondary school design as such.

WHAT PROGRAM REQUIREMENTS MUST THE SECONDARY SCHOOL PLANT PROVIDE FOR?

In order that this section may really get down to the problem of design in terms of program requirements, six specific proposals will be made. It is understood that making these proposals exposes the maker to two essential risks. The

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[6] Olson, Willard C., *Child Development*, D. C. Heath and Co., Chicago, 1949.

[7] Koopman, G. Robert; Miel, Alice; and Misner, Paul J., *Democratic School Administration*, D. Appleton-Century Company, New York, 1943, Ch. 2.

[8] National Association of Secondary-School Principals, *Planning for American Youth—An Educational Program for Youth of Secondary-School Age*, The Association, Washington, D. C., 1951.

first is the risk of inadequate communication due to the time limits and the communicative situation. The second is, of course, the risk of over-extending the analysis to the extent of pushing the point to a ridiculous and impractical extreme. However, these risks are taken because of the need to pin down certain essential quantitative space requirements and space arrangements. The absolute minimum in terms of types of space that the program requires seems to be: (a) facilitative space, (b) all-school social function space, (c) reserve space, (d) specialized activity space, (e) self-contained classroom space, and (f) extramural space.

Facilitative space. Facilitative space refers to the kind of space that is not used directly for learning activities by the learners in a school, but in its indirect way is essential to the continuous use of space and to giving leadership to the program. This kind of space can be divided into three kinds. First, there is the servicing and maintenance space having to do with the housekeeping in the building. This kind of space is all too familiar to school planners. It varies greatly in different types of buildings and is well known to all. Furthermore, a discussion of it is not too pertinent in this paper.

The second kind of facilitative space is, of course, the space given to administration. It includes administrative offices, clerical offices, lounges for teachers and visitors, toilets for administrative personnel and visitors, and facilities for consultants who enter the building to work with teachers. So far as I know there are not many major controversies in this field, although the entire field is experimental and should be so treated. As the professional personnel of the school system tends to serve more as consultants to community groups, more space will be required for administration. For instance, a school that prides itself on being a separate institution for the formal education of teen-agers will require much less space than a school that operates as a community center.

The third kind of facilitative space is circulation space, such as corridors and stairways. This space should always be minimized, except where another function than circulation is being served.

All-school social function space. The life of a group of several hundred young people living within one building during even a part of the day actually constitutes a subculture

within the community culture. The group creates new mores and reinterprets old mores. Young people in this group are expanding their horizons rapidly, and most of their learnings must come from their peers even though their most significant learning and guidance should come from their elders. But elders cannot enter directly into the lives and problems of adolescents in a rapidly changing society. Even adults who use the secondary school plant or the peoples colleges, whichever one may wish to call it, have great urges to meet each other, to exchange experiences with each other, and to gain the psychic support that comes from a felt relationship with other human beings. Thus the plant should provide adequately for space for informal grouping. Some illustrations of the kind of space intended should be the following:

1. Adequate foyer space to be used by younger students, adult students, visitors, and committees for such functions as serving teas, holding small committee meetings of three or four people, congregating temporarily between scheduled activities, and so forth.

2. Canteens which have enough floor space to encourage congregation on a sitting or standing basis during the period when refreshments are being consumed. In some small schools this space might serve buffet luncheons in order that informal congregation might be encouraged.

3. Student commons, a friendly place where background music might be provided and where students may sit in pairs to carry on serious work-type discussions or to visit socially.

4. Locker areas with adequate space to encourage a certain amount of temporary congregation.

5. Dining space so arranged as to avoid the impression of mass feeding and to encourage the development of social graces and socializing activities of an informal, unscheduled, unsupervised, untrammelled type.

6. Committee rooms where small groups may gather in an informal, unpressed situation for serious working purposes.

Reserve space. Somewhere between the all-school social function space and classroom space lies the kind of storage and display space that has direct implications for learning but where students do not assemble in any numbers. This

might be called reserve space or, to use a French term, atelier space. It includes some of the following kinds of space—instructional materials center that provides adequate space for open shelves, storage, displays, space for making selections of exhibits and collections of books and other materials, space for intensive research work (not study space), space for listening to recordings, space for viewing slides and films for selection purposes but not for direct presentation, space for scientific collections arranged in exhibit form. It is to this center that committees of students would bring their book trucks, make their selections, and then make up collections of books and other materials. It is here that musical instruments, recordings, sheet music, maps, charts, pictures, models, microscopes, balances, etc., would be stored and loaned out to the learners of all ages.

Specialized activity space. Instead of having a lot of specialized classrooms such as physics rooms where classes meet on a scheduled basis, minimal space should be provided for a large number of specialized activities that cannot be handled in the self-contained classroom or that occur so rarely that it would be unwise to provide for them in the self-contained classroom. A few examples will explain this principle.

A good school for secondary or adult education should do everything possible to encourage exploration into all sorts of fields, especially the new and unusual. While intensive study of physics is not a real need for most people, the school should provide space for carrying on a number of key studies in this field. Apparatus should be provided, the supervision of a highly specialized teacher should be available, and individuals and small groups should have access to a laboratory of this kind. The same could be said for the plastic arts and the industrial arts. A school in a rural center should have an adequate laboratory for experimentation with plants, animals, soils, and products. Scientific testing of materials should be encouraged. A great deal of such activity depends upon mensuration. Hence as many as possible of the finer tools of science for measuring action and reaction should be made available. Various kinds of home equipment should be tested. The home and family living objective should be implemented by having available space for trying out new processes such as cooking processes and sewing processes and new apparatus

such as dishwashers, stoves, and irons. While hanging a dress is not a process that every boy and girl should learn, a good school will provide the apparatus, the know-how, and the space so that those who are interested may learn that process.

A school should be provided with its dark rooms, its rooms where chemicals may be handled and where the unusual excursion into new areas may take place. At present one occasionally finds a photographic laboratory in a school, but it is usually dedicated to serving one particular department or one particular teacher. This practice discourages the achievement of the objective of experimentation and reaching outward.

The provision of specialized areas where individuals or small groups would go to learn depends upon an administrative system that allows individualization of instruction. The self-contained classroom provides for such a scheme.

Self-contained classroom space. The heart of the school should be the self-contained classroom. Here is the site for the life of a group, a group that should in a period of four years create a subculture, a group that should in a period of four years give to any individual member that security that he needs in his second home. For some unfortunate individuals, the self-contained classrooms will in the affective sense be the only true home that they have.

The adoption of the principle of the self-contained classroom is based upon the essential summary of the findings in child growth and development, in mental hygiene, and in sociology. This concept has been summarized in a portfolio in the January, 1952, issue of *The Nation's Schools*, and no attempt will be made here to give a precise definition of the concept. By way of explanation and justification, however, the reasons for dedicating the main part of the space of a building to self-contained classrooms should be given. The first reason, of course, goes back to the previous argument about the importance of citizenship as the over-all objective of education. A school that fractionalizes its program around different blocks of subject matter is obviously not accepting citizenship education as the reason for being or as the basis of organization. A school that maintains hundreds of clubs dedicated to personal interests is not making citizenship education its primary purpose. A school that houses teachers and pupils who do not know each other except as names or casual

contacts or counselees is serving neither the mental health objective nor the citizenship objective. Both research and experimental living in self-contained classrooms have justified the principle that the simplest form of organization is the best. A school that has eight classes is eight times more complicated than is the ordinary elementary school where one class period essentially indicates the kind of organization followed.

It has already been indicated that a good school will have other kinds of instructional space. This is an admission that not all of the learning for which the school is responsible can or should take place in the self-contained classroom. At the same time it is argued that the best form of teacher-pupil relationship, the best method of organizing pupil personnel, and the best method of internal administration are all satisfied by the adoption of the self-contained classroom. The common learnings program recommended by the Educational Policies Commission in *The Education of All American Youth*[9] can only be implemented by the self-contained classroom. Of course the core curriculum procedure as expounded by Faunce and Bossing[10] represents a self-contained classroom.

The requirement here is a large classroom space (1,200 to 1,400 square feet) entirely flexible in its arrangement. Nothing should be built in except the plumbing. Such a room is large enough to allow pupils to be separated physically for working individually or in small groups. At the same time it is large enough to care for toilet, work sink, work bench, and audio-visual, wardrobe, and storage needs. To increase flexibility the space should be arranged essentially in a square or nearly square rectangle without any partitions of any kind.

Extramural space. It goes without saying that space for learning must include extramural space. In fact, the need is quite well accepted today, although the extramural space on the school site is usually very poorly planned and poorly utilized. Very little need be said about the purposes for providing this space. Again, socializing activities, learning in special and unusual areas, congregating of large groups, enjoying and

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[9] *Op. cit.*

[10] Faunce, R. C., and Bossing, Nelson L., *Developing the Core Curriculum*, Prentice-Hall, Inc., New York, 1951.

learning the common sports, attending outdoor theaters, and meeting in outdoor classrooms are illustrations of the constructive use of extramural space. The exact amount of extramural space depends upon community conditions. An integrated recreation program in a community would affect space requirements. If much state land were available, a school forest might be unnecessary. Community resources should always be fully utilized.

The above six space requirements cover all of the essentials. The question of space for music rooms, auditoriums, gymnasiums, swimming pools, rifle ranges, and bowling alleys immediately comes to mind. The reason for the omission of these is that I cannot see any justification for these activities that is related to the essential program of the secondary school. A thoroughly desirable program of secondary and adult education can be carried out without any such activities. Communities have lived in the out-of-doors for ages. Inventiveness in the use of space is good for people. A properly designed secondary school program would have no need for all of these auxiliaries. True, a nice gymnasium is a fine thing to have. Auditoriums are useful, and there is no essential objection to such facilities although there is objection to large music rooms and cafeterias. As a matter of fact, community needs are usually used as a justification for such buildings. It is time that they be placed squarely on that basis and that they be justified on a community basis rather than on the basis of the fact that pupils of secondary school age are educated in that building. It is true that a well-organized community should have available space where large sections of its population might gather, but that might be in the civic center rather than the school, or, better yet, the civic center might be planned and constructed in conjunction with the building that will house upper secondary or community college education. The point that is made here is that, in the main, learnings for both secondary school pupils and adults will take place in well-organized, well-supervised, well-taught classrooms rather than in all the auxiliary spaces that are becoming so popular. Economy alone indicates that the dollars that will be spent for plant should be spent for the space that will carry the main responsibility for achieving the objectives of the school. The new secondary schools that are opening their

doors today violate this principle in a most serious manner. Almost no space is designed for achieving the central purpose of citizenship education.

WHAT NEXT?

Theoretical approaches to a problem are made for the purpose of lifting oneself by one's bootstraps. Certainly in the field of forward planning theoretical approach is at one and the same time necessary and hazardous. No wise man would propose a theory without proposing follow-up and testing activities. The import of what is said here may be put in a capsule by saying that persons such as those represented here and organizations such as the National Council on Schoolhouse Construction should move off the narrow and venerable base from which we have all been operating into a systematic exploration of the problem and a systematic attempt to achieve a few general assumptions in regard to planning the secondary school plant. Only by such procedure can we begin to plan well the new plant which must serve the program of today and to encourage movement toward the kind of secondary school program that the future will demand.

The need for research and the need for a continuing study group or study groups has been previously mentioned. In conclusion I would like to re-emphasize these two points.

THE HIGH SCHOOL OF THE FUTURE

Discussion

Discussion leaders: Edward D. James, Carl G. F. Franzén, Christian W. Jung, and Grier M. Shotwell

MR. FRANZÉN: There are two or three points in our philosophy that Bob and I somewhat disagree on. Sometimes it is merely the use of a word, which is of course an easy thing to clarify. He refers to what he calls the dead past. Can it be assumed that because a thing is past it is therefore dead? There are too many people in the field of modern education who think only in terms of the present and the possible future. They go ahead with ideas and suggestions which to them are radically new but which, when subjected to scrutiny, can be found to have not only their seeds but also their counterparts in the past. To talk about a dead past is to assume no debt to the founding fathers who made this present of ours possible. If it were not for our own past, we would not be where we are today. The smart alecks 50 and 100 years hence will have the same attitude toward a dead past that is your and my present.

So it is with the future. Every realist recognizes that society's only interest in the individual is that of preparing him for his future citizenship, duties, and responsibilities. Our trouble lies in our jumping too far into the future, so far in fact that the individual sees no relationship between his studies and the experiences he may have. The idealist, in trying to correct the situation, has gone to the opposite extreme of practically limiting everything to the present moment—even to the extent of talking about meeting only the present needs of the individual. Any more foolish approach to the problem of education, I cannot conceive.

There is a sensible middle path that can be followed—that of recognizing the needs of the future, many of which we can fairly accurately predict, and accommodating them to the various comprehension levels of child and youth. The future does not change too suddenly to prevent us from adapt-

ing learning experiences to the necessary changes that take place. I insist that this accommodation can be made, perhaps not perfectly, in a school building that was constructed during a period of prevailing educational philosophy inconsistent with the one acceptable today. Life for each one of us is a constant preparation for tomorrow, whether that tomorrow be 24 hours or 24 years away. In order to give heed to the things of today, so that the things of tomorrow will take care of themselves, we must have some idea of what these things of tomorrow are. An out-and-out acceptance that life is not a constant preparation for the future, that each day in school is not a preparation for the next day, and that each year in school is not a preparation for the next year cannot help resulting in the kind of education that is directionless, soft, and weak. It reminds me of the old song, "I don't know where I'm going, but I'm on my way."

The trouble is that when a school building is built, it is built in terms of the purposes that it is expected to serve. These purposes can change faster than the building. That is obvious. Dr. Seagers has told me that obsolescence sets in in any building the minute it is constructed. The School of Education building was obsolete the minute they moved into it. No, it was obsolete the minute the contractor gave the estimate on it. There is nothing particularly original about that. When education was a fairly static affair and served only the few, it didn't make so much difference what the building was like. But now that education tends in the direction of a peoples college, which term, by the way, is as old as the inscription of the New Albany Junior High School put there by Prossert, the building must of course be a flexible one.

I like Dr. Koopman's organization and presentation of points of view with regard to his facilitative space, all-school social function space, reserve space, and specialized activity space, but I do not agree at all with his self-contained classroom space. He mentions fractionalizing the program. He has a right to object to such a program as an idealist. A realist knows that that is the kind of program that we are going to have as long as any of us in the audience is still alive. There is greater possibility for his self-contained classrooms on the elementary level and he has some very excellent pictures of schools in which this is done. It can be done. Why? Because

you have the one-teacher proposition. You cannot have a self-contained classroom organized on the present system of the subject areas—a system that is going to persist in high school for many, many years to come. When the self-contained classroom is proposed for the secondary schools, the suggestion assumes fantastic proportions. What about the core? Experience has proved and is proving that the core on the secondary level can be carried on only in language arts and social studies, in the home room, and in the practical arts area. It simply cannot work in other areas because of the type of preparation demanded by the teacher.

It is ridiculous to assume that there is no place for very desirable activities in auditoriums, gymnasiums, and special music rooms. The neighborhood school is a school caring for levels N-K-10 and for such adult education as should be centralized by neighborhoods. This is called radical; yet the statement is made later that it would be better to have the community activities taken care of in civic centers than at the school. It is inconsistencies such as this that mark the idealistic visionary. He really does not have the picture of the whole—just a segment here and a segment there. The recreational side of the school should receive more attention, especially since it has become necessary for us to provide places for our youth to learn profitable forms of entertainment. The interior aspects have been very well presented, but the exterior ones have been slighted—they have only been hinted at.

Now, to become a little more particular. The high school of the future will have the necessary acreage to provide for the following facilities (I can dream too): gardens—vegetable, flower, experimental; a greenhouse; an animal laboratory; soft ball and hard ball diamonds; fields for hockey and socker; football practice and playing fields; a quarter mile track; tennis courts; volley ball courts; badminton courts; a golf course; croquet courts; long bowling greens; horseshoe pits; and basketball courts. I consider the above facilities possible solutions for the problem of what the youths and adults of the community may do with their spare time. If the school, as has been suggested over and over again, is to be a community affair, then it is the place to provide these recreational facilities.

MR. KOOPMAN: I will make partial answer now, but I don't want to shut out these other three gentlemen. The basic question about the past was in my speech. I thought the time had come to stop planning secondary schools for the past and the present and start planning them for the future. A good functional approach to the problem of living when you build a building, I think, permits considerable forecasting. You don't know the social conditions under which man will live, but you can guess some of the trends. As a former student of history, and I still do a little historical work of my own on the side, I think I know about the past and how to use it. I am also interested in anthropology. I think that the time has come when we should start planning buildings for the future instead of having some professor of home economics build in a building the suite that she wanted to build 20 years before when she was in secondary teaching.

One other point about the question of needs. I did not recommend teaching for present needs. I am not a needs person, and I pointed out that there should be continuing functions that are given high priority. I said that any school like this should have its core function but should do what the land-grant college does. It meets any need that comes up. I used a rather old-fashioned term. The first priority should be given to inducting youth into society. Citizenship is a forward-looking thing as well as a backward-looking thing and it is the only thing that will give us perpetuity and survival. We want a living citizenship—one adequate to stand the test of time—one that will make it possible for a boy to be a Japanese or a Chinese prisoner of war at camp for two, three, or four years and still believe in the American way of life. There isn't a single high school in America that uses citizenship as its primary purpose.

MR. JAMES: I wonder if I could sound off. I have been sitting here quietly. Last night Bill buried all of the old architecture, and you put it another foot under the ground. We thought we had it buried pretty well, but along comes Franzén and digs it up and says it is all right.

MR. FRANZÉN: No. No. No.

MR. JAMES: Regardless of what we have done in school architecture in the last 10 years educationally, we are profiting by the new system of thinking that has come about. You

educators are demanding more of yourselves and you are working together with the architects at a closer range. Maybe the new school is not the perfect building, as some of you say that it isn't, but I am convinced it is a far more functional building than the old one—one that will live longer in the minds of the children and will be a pleasant place to lounge and to have recreation.

Would any of you have thought about going back to school after school hours just to play around? I went to Manual Training High School in Indianapolis and I thought it was a pretty good high school, but somehow or other at 3:30 P.M. I got out of there and was glad of it until the next morning. I think that is the point of view of practically all of us, but I don't think it is the point of view of the younger generation in places where we have pulled the life of the community into the school building and made it more than a place to be commanded by our superiors. We architects have tried to give an architecture that will cloak this new method of teaching in more pleasant surroundings.

MR. SHOTWELL: I don't know whether I have very much to add here. I have no qualifications as an educator and I am not an architect. I am just a plain ordinary lawyer and a member of the school board. It seems to me that our problem in the next few years is to find out how to get the best use of the money we have to spend for school buildings—first, from the standpoint of a good educational plan and then from the standpoint of a good architectural adaptation of that plan. I think we are all going to find in our communities—and we certainly are in Indianapolis—that the tremendous number of children coming to our schools is going to tax the ability of all.

I was very much interested in what you said about different kinds of space in school buildings. We are finding that cubic footage or square footage is a very important factor in providing adequate facilities. I don't know how far we can go beyond the essentials, within the next few years at least, in providing space for the children we must care for. I am not at all in favor of reducing the school building to a very utilitarian plan, but I do think we are going to have to give up many of these space units which we have been talking about, desirable as they may be. We are already, in Indian-

apolis at least, reaching the point of wondering where we are going to get the money to pay for the schools, for we know that, at a certain point, the taxpayer is going to have the same rebellion with respect to local taxes as he has with respect to excessive federal tax. Most of our parents and most of our citizens who deal with schools are going to go just as far as they think they can, provided they have good reason to believe that those who are spending the money for them are acting wisely and in the real interests of the children.

I quite agree with Ed James that, in the main, the school buildings across the country do not present a very attractive appearance. They are not places you would care to hover about. Some of our newer schools with simple lines are much more attractive. In a large city we have a good many problems that are different from those that you have in a smaller community. One of ours is juvenile delinquency. Many of the children in Indianapolis have no gymnasium facilities or even outdoor, easily accessible outdoor, recreational facilities. It seems to me that we should come as near to a wide use of space as possible, making it as adaptable as possible and thereby allowing for changing educational ideas and philosophies. We should recognize the right of children in our poorer areas to have as good facilities and as attractive facilities as those in a part of the community where more favorable living conditions exist. That is one factor on which the school board in Indianapolis is working. Unfortunately, most of the older buildings are in the older sections of the city and those sections are generally the poorer ones. It seems to me the children who come from those sections perhaps need a lift more than do those who live in the newer sections where their home life and surroundings are much brighter and more cheerful. I am convinced that we need to talk to our taxpayers and parents in terms that they will understand, and that we must follow a line of action which is understandable to them along with a plan which is adaptable to various areas.

A secondary school needs to give a good cultural education to those who are going on to college. It should have adequate space for a chemistry laboratory and for physics and biological studies in addition to ordinary classrooms. I think we are going to have to have cafeterias for the children who live some distance from the school. Also, we are going

to have to provide reasonable facilities for gymnasium activities and for plays and musicals. It seems to me a few of these things have made good sense through the years, just as certain things in a house make good sense. We need the kind of touch that will uplift us without being monumental, the kind that will win the confidence of the people who are going to have to pay the bill for our secondary school buildings.

MR. JUNG: Let's get first things first. We are talking about the teaching of citizenship as the prime purpose of the secondary schools and about individualizing instruction so that each child will gain to the maximum as a person living satisfactorily to himself and to his community. No one denies the necessity of a good building and good facilities, but let's not put the building and the facilities ahead of good teaching, because a good teacher and poor facilities will do a better job of teaching citizenship than will a good building and a teacher who is poorly trained or has inadequate purposes or goals in mind. If we are building a building to teach citizenship, and that is the primary purpose of secondary schools in the American social order, then let's put these things in the order of their importance.

It seems to me that in the secondary schools today we haven't even touched the trends toward relating education to a person's job and his leisure time. Much education is being done entirely outside of the school itself. In the years to come we can't help doing something about nonacademic education. Currently we educate the majority of youngsters in our secondary schools; a little more than half of them graduate from school. We are moving from large numbers of youngsters to a more nonformal, less traditional, more nonacademic type of educational program, and I am not sure what that is going to be. If you are really interested in teaching citizenship, does it make any difference which vehicle you use as long as it is used effectively and in keeping with what you and I would accept in our schools? Can you give me an example of a school in which you can teach citizenship any more effectively than in an orchestra where individual responsibility and the necessity of each one performing his part is important?

I wonder how long communities are going to pay for and maintain separate semieducational agencies in a community

and not use the American public school, which is there to begin with. I am looking at Bloomington now. I wonder how long those of us who are participating citizens in our community will continue to finance a program such as the Juke Box and certain playgrounds and other activities. I suspect that within 25 years community after community will become aware of the semieducational agencies that are duplicating facilities already set up in the high school. I think our guest speaker this afternoon suggested that maybe it would go the other way, and I would go along with him. High schools are trying to do many things they have no business trying to do. I wonder if it would be more practical for us to move these activities out of the school or to let them move in on a truly community cooperative basis.

I think we also should recognize the fact that communities should use their secondary schools. The community has barely scratched the surface in getting the services that it wants from the school and that it will get from the school in the next 25 or 30 years. This is true in the case of the use of building facilities as well as in the case of the training of personnel and the quality of education offered. I wonder whether the junior high school has really been given the opportunity to succeed. Not one time since the junior high school was founded have we intelligently approached the task of trying to make a junior high school work. We have never developed a teacher for the junior high school, we have never developed a curriculum by itself or even attempted to develop a junior high school curriculum by itself with the exception of one or two outstanding studies.

MR. FRANZÉN: Of course, we are going to have those grades no matter what we call them. Don't forget that; they are still there. Just because you don't call them a junior high school doesn't mean that you are doing away with them.

MR. KOOPMAN: I would like to comment on that music. I think that was a good point. We feel that music is an essential element of development. We are turning out secondary teachers who cannot lead the children in the singing of a hymn or of "God Save the King" or of "America the Beautiful" or of anything else. I think that a simplified program such as the self-contained classroom would provide a vehicle

for all of these things. Music would be taught in the self-contained classroom.

MR. FRANZÉN: You are talking about different kinds of music.

MR. KOOPMAN: I know quite a few teacher training institutions in which you can graduate without any English except English Composition. I know schools of teacher education where they require only three hours in social studies. This might make it possible for a youngster to get through school without any American history. So music isn't by itself in that situation. I am willing to grant you that the education of the American secondary teacher at the present time is not in too good a condition; however, I think it is better than it has been.

If we go to self-contained classrooms, how long should the training be for the various subjects that students must take? The elementary teacher has five hours, we will say, of biology, five hours of chemistry, five hours of physics, five hours of American history, five hours of geography, and so on, and this is typical. We run into it time and time again. Yet on the secondary level the best we have been able to do, at least in many parts of the program, is to give a distributive type of degree. Since we feel that a secondary teacher must have more training, we give a distributive degree, we train a teacher in three fields or four fields a little deeper than the elementary teacher is trained but not quite widely enough for her to teach music, art, English, history, social studies, mathematics, etc. She can teach social studies, English, and a foreign language maybe. It has taken that much of a step, which I think is an improvement over what it has been in the past.

MR. FRANZÉN: That is why your self-contained classroom is still visionary as far as the secondary schools are concerned. It can be taught only by a very superior teacher, and if you are talking about the high school of the future, you have to talk about the high school that can be built in Podunk as well as in the big city. It has to be that kind of school in the future, and it is going to be manned not by these superior teachers but by a cross-section, by the ordinary run of teachers. I think the ideal is a fine one, but I say you have to face the fact that this is the situation and that you might as well build your school of the future for it.

Now the point is this, the school of the future must be flexible. I think that is the important thing. Look at some of these old school buildings. They were built to stand the storms of time and tornados and everything else. The interior walls, as you know, could not be moved. I think the school of the future should have a floor and a roof, with partitions that can be made any way you want them. Probably then, if the time comes, you can put your self-contained classroom in that building. I think that is the solution for the school of the future. It can be adapted, don't you see, to any varying change of philosophy. If you want large rooms, you can get large rooms; if you want small rooms, you can get small rooms.

MR. KOOPMAN: The American secondary school of the future has to do whatever has to be done to keep this ever-ascending curve of American culture going. The difficulty about the teachers doesn't disturb me at all. The teachers we now have can teach self-contained classrooms. It does not take a superior teacher; it takes the teacher you have plus good policies, good working conditions, good direction and leadership on the part of the administrator and the board of education, and plenty of good in-service education. It takes 10 per cent of your budget for good in-service education.

I think I agree that we can pay for anything that we want badly enough. If we really believe we need a good educational program, the American public will be willing to pay for it. We pay for so many things other than education. Yet I think we are reaching out into the future too far. We anticipate that secondary teachers in ordinary training can teach everything that is necessary for youngsters in a completely self-contained classroom. I am conservative, but I will go along with self-contained classrooms in high schools on the secondary level for some portions of the program. But if we are to meet each child's needs adequately and intelligently, it seems to be time to take youngsters out of a self-contained classroom and take them where they can get a specialized type of work. It is almost impossible to imagine everybody being able to teach specialized courses. I think we run into a situation which causes some trouble in core programs. The core program and the self-contained classroom sound a lot alike to me in many respects.

I want to point out, particularly to school building specialists and architects, that I am so conservative that I think I have seen some buildings being built recently that are not at all obsolete in the educational program as I look at it in 1953. I saw a couple of buildings quite recently that looked to me as if the educational building consultants and the architects joined together with the school people in their community and did a fine job in thinking through an educational program. Their buildings will probably be modern as long as the buildings will stand. When they become obsolete, they probably should come down anyway. I admit they are flexible buildings, but they are not obsolete.

MR. JAMES: I like that term "obsolete." I want to hit that very quickly. We have been building schoolhouses too well with too much material, with too much concrete and too good a construction for too long. All schoolhouses ought to be torn down in 30 years. The ones that don't fall down ought to be completely eliminated. When we have to put additions on these horrible examples in Indiana today we try to talk ourselves out of the job rather than into it. But it is true, I mean that absolutely, that we are required by law to build our buildings too well. We are required by law to build them in a manner that is not in keeping with the things we have been talking about; for example, the elasticity of a plan by which you can move the partitions as you see fit and still have the room functioning as we architects and you educators have planned. We have to minimize the cost of construction, and when we do that we generally end up with a better building.

MR. KOOPMAN: Mr. James, I am glad you disagreed with me. I am going to disagree with you now. Ever since 1946, when I came back from Europe, I have been hearing about not building buildings to last. I don't agree with that. As I drive through the country and see these terribly isolated schools built out in the open country without any relation to any community, I am sure they ought to be torn down because they should not have been built there originally. But in a situation like ours, where we threw up a town in just a few days, things tend to grow together, and I think we should go back to the old conservative community planning, the Latin planning approach, and we should build buildings to last 400 years. If we make a mistake, of course I want it torn down.

But don't forget that these school buildings that we are complaining about, these older ones, were not built by any school architects because there were no school architects in America then. I don't think we have any yet, but I think we are getting them. In the last few years we have made progress through the efforts of some fellows right here in this room and of a few people like them, and through the efforts of some of you architects who have been in there pitching and studying. We don't have any trouble getting architects to our school plant workshops, and they are open-minded. I think we are working together now and are going to make real strides. But I don't think it is practical to build a temporary building. I don't think you can do it architecturally. From the educational point of view I want you to build a fine building that melts right into this hillside and fits right into the community alongside this church, just like those beautiful and wonderful old school buildings of the older continents where you have fine adjustment of architecture and function.

MR. JAMES: I don't know of a single good building on the campuses of Oxford and Cambridge today. I know that those buildings were designed conscientiously by the finest minds in architecture at the time. They did everything they knew how to do, but that was 600 years ago. Ideas have changed, our planning is different, our lives are different, and we cannot blame the architects of the past for the monstrosities that we have today. That is what we were thinking—that, as we change, these buildings must change.

Bulletins in the Field of Education
Indiana University

The Bulletin of the School of Education, Indiana University, was first published in 1924 and has appeared regularly since that time. Research studies of interest to educators, proceedings of conferences held, and bibliographies of educational materials have been principal fields touched upon in these bulletins. A complete list of the bulletins may be obtained from the School of Education upon request. The studies included in the present volume and in the two volumes immediately preceding it in date are listed below. Unless otherwise noted, these may be obtained for 75 cents each from the Indiana University Bookstore, Bloomington, Indiana.

Standardized Testing in the Schools of Indiana. By Roscoe A. Boyer and Merrill T. Eaton. Vol. XXVII, No. 1, 1951. 39 p.

Attitudes and Opinions of School Board Members in Indiana Cities and Towns. By Maurice E. Stapley. Vol. XXVII, No. 2, 1951. 42 p.

Some Characteristics of the Secondary School of the Future in the Light of Modern Developments. By Howard T. Batchelder and Shirley H. Engle. Vol. XXVII, No. 3, 1951. 34 p.

A Study of Some Opinions of High School Students With Regard to Teachers and Teaching. By Robert W. Richey and William H. Fox. Vol. XXVII, No. 4, 1951. 64 p.

Preprofessional Experiences in Educational Psychology. A Review of Opinion and a Critical Note. By Arthur P. Coladarci. Vol. XXVII, No. 5, 1951. 30 p.

Indiana and Midwest School Building Planning Conference: Proceedings. Vol. XXVII, No. 6, 1951. 139 p. $1.

The Story of a Workshop. By Maurice E. Stapley. Vol. XXVIII, No. 1, 1952. 47 p. $1.

Factors That High School Students Associate with Selection of Teaching as a Vocation. By Robert W. Richey, Beeman N. Phillips, and William H. Fox. Vol. XXVIII, No. 2, 1952. 46 p. $1.

Extracurricular Activities in Indiana High Schools: The General Program, and Student Participation in School Government. By Christian W. Jung and William H. Fox. Vol. XXVIII, No. 3, 1952. 85 p. $1.

Extracurricular Activities in Indiana High Schools: The Club Program. By Christian W. Jung and William H. Fox. Vol. XXVIII, No. 4, 1952. 53 p. $1.

A Study of High School Guidance Services in a Six-State Area. By H. Robert Kinker and William H. Fox. Vol. XXVIII, No. 6, 1952. 108 p. $1.

The Local School Facilities Survey. By Harold H. Church, Paul W. Seagers, W. Monfort Barr, William H. Fox, and Maurice E. Stapley. Vol. XXIX, Nos. 1 and 2, 1953. 96 p. $1.

The Tenure of Indiana School Administrators. By Raleigh W. Holmstedt. Vol. XXIX, No. 3, 1953. 36 p. $1.

A Guide to the Source Materials Relating to Education in the Laws of the State of Indiana, 1816-1851—Part One: 1816-1838. By Velorus Martz and Stanley E. Ballinger. Vol. XXIX, No. 4, 1953. 96 p. $1.

An Experimental Analysis of Patterns of Differential Verbal Reinforcement in Classroom Situations. By Edmund V. Mech, Francis M. Hurst, J. Donavon Auble, and Nicholas A. Fattu. Vol. XXIX, No. 5, 1953. 26 p. $1.

Indiana and Midwest School Building Planning Conference: Proceedings. Vol. XXIX, No. 6, 1953. 104 p. $1.